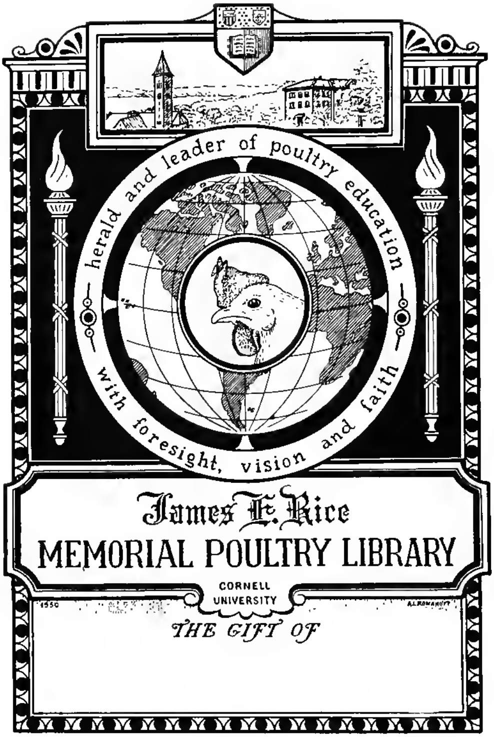
SF
487
P886H

# HOW TO FEED HENS FOR EGG-PRODUCTION

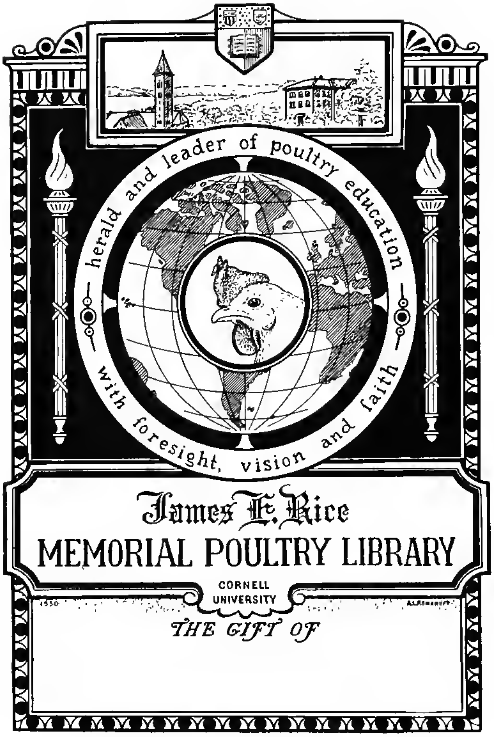
PRICE 1/6 NETT.

PUBLISHED BY
THE POULTRY PRESS LTD
154 FLEET STREET LONDON E.C.4
*Proprietors of The Poultry World.*



herald and leader of poultry education
with foresight, vision and faith
James E. Rice
MEMORIAL POULTRY LIBRARY
CORNELL
UNIVERSITY
THE GIFT OF

Cornell University Library
SF 487.P886H
How to feed hens for egg-production.A pr
3 1924 003 045 022
mann


herald and leader of poultry education
with foresight, vision and faith

James E. Rice
MEMORIAL POULTRY LIBRARY
CORNELL
UNIVERSITY
THE GIFT OF

Cornell University Library
SF 487.P886H
How to feed hens for egg-production.A pr
3 1924 003 045 022
mann

Cornell University
Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.

http://www.archive.org/details/cu31924003045022

# HOW TO FEED HENS
FOR
# EGG-PRODUCTION.

From The Library of
Dr. Olney Brown Kent

4/

[Powell-Owen, William]

# HOW TO FEED HENS

FOR

# EGG-PRODUCTION

A Practical Guide showing how Heavy
Egg-Production is governed
to a very great extent by
Scientific Feeding.

[Powell-Owen, William]

THE POULTRY PRESS,
*Proprietors of "The Poultry World,"*
151 & 154, FLEET STREET, LONDON, E.C.4.

[1920?]

87

See p. 56

SF
487
P886 H

E 7763

# CONTENTS.

## CHAPTER I.

### THE FINISHED PRODUCTS.

Analysis of New Laid Egg—Analysis of Hen—Analysis of Table Bird or Capon.

## CHAPTER II.

### CONSTITUENTS OF FOODS.

Careful selection of Foods—Natural *versus* Artificial Foods—Body heat of a Hen—Necessity of Energy-producers.

## CHAPTER III.

### COMPILING A DIETARY.

Finding a Ratio—Analysis of Egg and Hen—Feeding Formula—Balanced Rations explained—Ratio of complete Menu.

## CHAPTER IV.

### GRAINS AND THEIR VALUE.

Wheat—Wheat Bran—Wheat Middlings—Bread—Wheat Screenings—Maize—Oats—Ground Oats—Sprouted Oats—Barley—Barley Meal—Sprouted Barley—Malt Culms—Rye—Rice—Rice Meal—Buckwheat—Buckwheat Middlings—Sunflower Seeds—Beans and Peas—Linseed—Change Feeds—Composition of Grains (Table)—Weight of product per bushel—Measures used in Sale of Wheat.

## CHAPTER V.

### ANIMAL FOODS AND THEIR VALUE.

Meat Scrap—Meat Meal—Bone Meal—Green Bone—Fish Meal—Milk—Skim Milk—Composition of Animal Foods (Table).

## CHAPTER VI.

### GREEN FOODS, ETC., AND THEIR VALUE.

Alfalfa Meal—Clover—Potatoes—Lettuce—Onions—Cabbage—Salt — Grit — Mustard — Water — Charcoal — Composition of Green Foods, etc. (Table).

## CHAPTER VII.

### SUMMER AND WINTER FEEDING.

*Summer Feeding*—No morning mash—Semi-confined Fowls—*Winter Feeding*—On Free Range—Noon Feed—Evening Grain—Semi-confined Fowls—Value of Mustard—Grit in Winter—Warming the Grain.

## CHAPTER VIII.

### WET *versus* DRY FEEDING.

Trough feeding of Wet Mash—Dry Mash and Hoppers—Scratch Feeding of Corn—Grain and Hopper Feeding—Feeding Systems compared.

## CHAPTER IX.

### FEEDING HENS KEPT ON THE INTENSIVE SYSTEM.

Mammoth Laying Houses—Keep Hens busy—Drinking Vessels, etc.—Hopper Feeds—Sprouted Oats—Systems of Feeding—"Rancocas" System of Feeding—Dry Mash System—Summer and Winter Feeding—Semi-Intensive Methods.

## CHAPTER X.

### FEEDING HENS IN CONFINED RUNS.

Cleanliness in Feeding—Feed early—Warming the Water—The Drinking Water—Need for Exercise—Grit—Value of Green Foods—Summer Feeding—Winter Feeding—Use of Bran.

## CHAPTER XI.

### FEEDING HEAVY EGG-PRODUCERS.

"Lady Cornell"—"Belle of Jersey"—The Cornell System of Feeding—A 291-egg Hen—Other heavy egg-producers.

## CHAPTER XII.

### OVER-FEEDING *versus* UNDER-FEEDING.

Food per Hen—Study the Seasons—When Hens are Fat—A good Evening Food—To reduce Surplus Fat—Feeding Warm Mashes.

## CHAPTER XIII.

### SOME WELL-KNOWN EGG RATIONS.

Massachusetts Agricultural College Rations—Mr. Will Hooley's Dry Mash Menu for Intensive Hens—New Jersey Rations—Californian Rations.

## CHAPTER XIV.

### FEEDING LESSONS FROM LAYING COMPETITIONS.

Interesting Literature—Breaking the World's Laying Record—Contests at Storr's—Storr's Menu for Competition Birds—The Harper Adam's twelve months' Contest—System of Feeding—Conclusions.

## CHAPTER XV.

### FEEDING APPLIANCES, ETC.

The Feed House—Location of Feed House—Food Carriers—Coppers—Other Appliances—Troughs and Hoppers—Automatic Grain Feeders—A Hen Hospital—The Hay Box—Appliance Catalogues, etc.

## CHAPTER I.

# THE FINISHED PRODUCTS.

CLAIMS OF THE SCIENTIFIC FEEDER—COMPOSITION OF THE NEW LAID EGG—COMPOSITION OF THE HEN—COMPOSITION OF THE TABLE BIRD—BALANCING THE FOODS.

THE *up-to-date* poultry-keeper has at last, it would appear, decided to listen to the arguments of the scientific feeder. He admits that the best results must come from *feeding for the special object in view* and so works on a definite plan of campaign. There are far too many poultry-keepers, however, who still feed their fowls in a haphazard manner, believing, for instance, that provided laying hens have *plenty* of food they will in consequence lay *plenty* of eggs. The time has arrived when the feeding of our fowls must be carried out on certain definite lines. All will agree that the Poultry Industry in Great Britain was never before in so flourishing a state, and I trust a careful perusal of this little work will show the utility poultry-keeper the urgent necessity of taking special pains in the feeding of his hens. As I proceed, it will readily be seen why a bird being prepared for the table, must be fed quite differently to a hen whose duty it is to lay eggs in abundance.

As the direct object of this little work is to assist the poultry-keeper who is out for eggs in plenty, I will endeavour to keep strictly to the necessary channels of argument.

In the first place, it is necessary to know the composition of the finished articles under discussion. This will be seen from the table below. Eggs of course, vary in their composition—as do hens—but the analysis given are near the mark.

TABLE I.

| Product. | Water. | Ash. | Albumen. | Fat |
|---|---|---|---|---|
| New Laid Egg ... | 73·7 | 0·8 | 15·0 | 10·5 |
| Hen ... ... | 58·8 | 3·8 | 21·6 | 18·8 |

We will now take the composition of certain foods to discover why it is important that the feeding values of poultry foods should be fully understood by all poultry-keepers. The following table denotes the composition of Indian corn, carrots, and dried meat respectfully :—.

TABLE II.

| Food. | Water. | Albumen. | Ash. | Fat. | Carbo-hyd ates. |
|---|---|---|---|---|---|
| Indian Corn ... | 10·6 | 10·3 | 1·5 | 5·0 | 70·4 |
| Carrots ... | 88·0 | 1·0 | 1·0 | 0·4 | 7·6 |
| Dried Meat ... | 5·4 | 58·4 | 2·4 | 33·8 | ... |

One can easily guess why the old method of feeding laying hens on Indian corn has now exploded. It would be useless to give Indian corn exclusively for egg-production, for the analysis proves it to be lacking in both water and albumen. As it is so rich in carbo-hydrates (*i.e.*, 70.4), it can be used as a foundation for fattening table poultry. In like manner we shall, on referring to the composition of carrots and dried meat, find that such are unsuitable for exclusive use as food for poultry. Carrots are deficient in albumen, yet contain very much water, whilst the very opposite is the case as regards dried meat.

By bearing in mind the first table, where the analysis of the finished articles are given, and comparing same with any tables giving the feeding values of poultry foods, we shall be able to ascertain which foods are suitable for the object in view.

In table III, I give the approximate composition of a table bird, so that the utility poultry-keeper can compare same with the details in table I.

TABLE III.

| Product. | Water. | Albumen. | Ash | Fat. |
|---|---|---|---|---|
| Table Bird or Capon | 41·6 | 19·4 | 3·7 | 35·3 |

Any food so rich in fats that its analysis works out near Table III, can be used as a foundation food for fattening chickens.

So far we have established the fact that there is no perfect food that can be given exclusively for the production of both eggs and table birds. The foods used by the poultry-keeper must therefore be balanced according to the necessary requirements. This balancing of foods is imperative, and being such a simple matter, no poultry-keeper can afford to overlook its claims. As I go along, the reader will be able to grasp the situation and prove for himself the advisability of knowing the constituents of the various foods.

CHAPTER II.

# CONSTITUENTS OF FOODS.

---

CAREFUL SELECTION OF FOODS—NATURAL *VERSUS* ARTIFICIAL FOODS—BODY-HEAT OF A BIRD—NECESSITY OF ENERGY PRODUCERS.

THE law set down by the scientist is to the effect that the feeding of fowls shall be governed by the object in view. He very wisely points out that certain foods are most suitable for egg-production, whilst others are best used as fat producers. Only by careful selection of these foodstuffs can the object desired be achieved. Poultry foods may be divided up into two groups, (1) natural, (2) artificial. Under the first group will come such foods that the birds in their natural state would find for themselves. These would include :—insects, grubs, grasses, vegetables, etc. Group 2 would consist of—cereals or grains such as wheat, oats, barley, maize, buckwheat, dari, etc., etc.

We now come to the constituents of poultry foods, and we find that such foods can be divided into no less than six heads, *viz.*, (1) Albumen, (2) Carbo-hydrates, (3) Fats, (4) Water, (5) Fibre and (6) Ash. Several of the headings are also known by different names and although I will give same, I think it very advisable to keep to the six groups given above. These are the most common and the plan suggested will enable my readers to obtain a better grasp of the chapters and tables to follow.

*Albumen* is also known as :—Proteid, Protein, Nitrogen, Albuminoids and Flesh Formers.

*Carbo-hydrates* too, sometimes go under the names of Heat Producers, Starch, Sugar and Amylaceous elements.

*Fats* also go under the name of Oils, Hydro, Carbon, etc., whilst

*Ash* may be referred to as Mineral matter.

If the poultry-keeper remains loyal to the common terms applied to these elements, he will not get into difficulties. We will now consider the meaning of the six headings enumerated above.

*Albumen.* This refers to such compounds that contain nitrogen. These compounds usually go by the name of flesh-formers, which help to make muscle, bone, skin, blood, feather, eggs, etc. This food element must be present in all foods in suitable proportion. As the white of an egg is albumen, we must necessarily select foods that are rich in this element if egg-production is our direct object.

## CARBO-HYDRATES.

This is a term generally used to denote that class of nutriments composed largely of starch and sugars. The temperature of a bird's body ranges from 102° to 110° F., so that we must keep up this heat by supplying the birds with sufficient food of the right nature. Carbo-hydrates will furnish the body with this energy, and any surplus will be stored up as fat for future use. It will be seen from this that whilst sufficient carbo-hydrates are imperative to supply the requirements of the body, they must not be given in excess. If this happens, the bird may very quickly develop some fatty disease of the organs.

*Fats.* These apply to the oily portions of the food and perform similar duties to the carbo-hydrates. They are the highest form of heat producers we can have, and as a fuel are considered 2.25 times more valuable than carbo-hydrates or starch. In making out a ratio, the fats are multiplied by 2.25 or 2¼, owing to their value as compared with the cheaper fuel—producing carbo-hydrates. This will be fully explained in a later chapter.

*Fibre.* This is to be found in the sheath or husk of the grain, and is only digestible to a certain extent. A certain amount is necessary, however, to make the combined ration bulky and to help the bowels do their work. Foods containing too much fibre would naturally be useless, as there would be little feeding value in such grain. This should never be overlooked.

*Ash.* This ingredient is very necessary, for it stands for the mineral matter in a food. Such minerals as salts, magnesia, phosphates, etc., are very important, both for egg-production and chicken-rearing. Growing birds naturally require a greater supply of mineral matter than adult birds, as this element goes towards the development of the body-framework. Laying hens also require ash in good supplies for the shelling of their eggs. It is well-known too, that minerals help the digestion of other foods used in a ration.

*Water.* Our last ingredient is water and considering the amount of water in a new-laid egg, this element must be taken into account when the poultry-keeper is compiling scientific rations.

To sum up :—*Albuminoids* are muscle builders or flesh formers ; *Carbo-hydrates* represent heat and energy producers ; *Fats* are much the same as carbo-hydrates, only are 2.25 times more valuable as fuel ; *Fibre* is necessary to a degree, but an excess is not to be recommended ; *Ash* stands for mineral matter, and for growing birds (especially maturing pullets) is all-important. Laying hens also require a supply of ash for the formation of the egg-shells.

## CHAPTER III

# COMPILING A DIETARY.

FINDING A RATIO—ANALYSES OF EGG AND HEN—FEEDING FORMULA—BALANCED RATIONS EXPLAINED—RATIO OF COMPLETE MENU.

HAVING ascertained the constituents of poultry foods, we can now pass on to the compilation of a dietary or menu. Guided by the rules that follow, the average poultry-keeper can select his foods and make them balance as required. This balancing of the foods is necessary, as previously explained, as no individual food comes near enough to the required complete ration. The analysis of the egg and hen show that a *laying hen* requires a ration that contains 1 part protein to 4½ parts of carbo-hydrates and fat. When the hen is not in lay, the rations may be much wider than the above, even as much as 1 part protein to 6 or 7 parts of carbo-hydrates and fat, *i.e.*, 1 to 6 and 1 to 7 respectively.

To compile a dietary then, the poultry-keeper takes as his guide, the finished products and endeavours to balance one food with another until he gets his complete dietary or menu to work out at 1 to 4½ or 1 to 5.

To find the ratio of any food or foods we must take fats into account as compared with carbo-hydrates. As previously mentioned, the former are 2.25 or 2¼ times more valuable as fuel than the latter, so that in working out a ratio, the fats must be multiplied by 2¼ to bring them to one level with the other ingredients. The ratio of a food is arrived at by (1) multiplying the fats by 2¼, (2) adding the fats thus multiplied to the carbo-hydrates and (3) dividing the whole by the albumen element. The formula will therefore read

$$\frac{(\text{Fats x } 2\tfrac{1}{4}) + \text{Carbo-hydrates}}{\text{Albumen.}}$$

To work out the ratio of barley for instance, after the above formula, we have 1.8 (fats) x 2¼  69.8 (carbo-hydrates) divided by 12.4 (albumen). This will read :—

$$\frac{(1.8 \times 2.25) + 69.8}{12.4.}$$

This roughly equals 6/1 or a ratio of 1 to 6. This ratio would be a trifle too wide for egg-production, and so other foods are brought into play to narrow the ratio of the complete dietary down to 1 to 4½ or 1 to 5. To ascertain the ratio of a number of grains, etc., it is only necessary to add up the total under each heading and follow out the above formula. Having worked out the total of the carbo-hydrates and multiplied the complete total of the fats by 2¼, the two amounts are added together and divided by the full amount of the albumen.

In a balanced menu, it will occasionally be found that 2 *parts* of a certain food are used as against ½ part of another. When only 1 part of a food is recommended, the analysis of that food stands as in the table given elsewhere, but where 2 parts are used, this analysis must be multiplied by 2. If ½ part of a food is used, the analysis of that food is divided by 2, and so on. This is necessary to balance up correctly the food elements of the whole menu.

We will now work out the ratio of a day's rations, so that the reader may follow the rules laid down above. In the following table, the parts *above* or *below* the recognised *one part* have been allowed for, the analysis of the foods concerned having been multiplied or divided as required.

### MORNING FOOD.

| Part or lb. | Albumen. | Carbo-hydrates. | Fat. |
|---|---|---|---|
| 1 Wheat Bran ... ... | 15.4 | 53.9 | 4.0 |
| 1 Biscuit Meal ... ... | 12.0 | 64.0 | 10.0 |
| ½ Clover Hay ... ... | 5.3 | 16.8 | 1.9 |
| 2 Middlings ... ... | 31.2 | 120.8 | 8.0 |

### EVENING FEED.

| Part or lb. | Albumen. | Carbo-hydrates. | Fat. |
|---|---|---|---|
| 2 Oats ... ... ... | 23.6 | 119.4 | 10.0 |
| 2 Maize ... ... ... | 20.6 | 140.8 | 10.0 |
| Total constituents ... | 118.1 | 515.7 | 43.9 |

The total constituents of the day's rations will, therefore, read :—*Albumen* 118.1 ; *Carbo-hydrates* 515.7, and *Fats* 43.9. To find the ratio of the complete rations, we must therefore follow the formula referred to above. The ratio will read :—

$$\frac{143.9\ (\text{fats}) \times 2.25 + 515.7\ (\text{Carbo-hydrates})}{118.1\ (\text{albumen})}$$

$$= \frac{98.775 + 515.7}{118.1} = \frac{5}{1}$$

The albuminoid ratio of such a menu would thus be somewhere near 1 to 5 or 1 *in* 5. With this matter of working out the ratio thoroughly mastered, the poultry-keeper can easily higher or lower the ratio as required. This will be dealt with later when the reader will see the advisability of balancing the rations when dealing with winter menus, as compared with those most suitable for summer use.

Another, and perhaps simpler method of finding the ratio of a *combined* menu, is by means of the analysis of each food. Supposing that the evening grain consists of

4 parts Wheat | 2 parts Maize | and 2 parts Oats.

We must first take the ratio of each grain, *viz.*, wheat 1 in 6, maize 1 in 8, and oats 1 in 6. The ratio of the mixture is arrived at as follows :—

1 in 6 x 4 = 4 in 24
1 in 8 x 2 = 2 in 16
1 in 6 x 2 = 2 in 12

*i.e.*, 8 to 52 parts, which is a ratio of 1 in 6½, or 1 of albumen to 6½ of carbo-hydrates.

## CHAPTER IV

# GRAINS AND THEIR VALUE.

QUALITY IN GRAIN—BUCKWHEAT FOR WINTER USE—USE OF BRAN—POOR FEEDING VALUE OF RICE—SPROUTED OATS—COMPOSITION OF GRAINS.

IN purchasing grain it must be remembered that there are several grades, the difference being in quality, colour, soundness and size. A good sample of grain would naturally be more profitable as regards results than an inferior sample. When purchasing corn, too, the buyer should take up a handful and taste a few grains. Any corn having a peculiar taste should be avoided. Mildewed, etc., corn will naturally prove harmful to the fowls.

**WHEAT.** Wheat is easily one of the most popular kinds of grain used for feeding fowls and despite the fact that it is not over-strong in albuminoids, it is most suitable for balancing a ration. It can be used in the whole grain for adult stock or crushed for chickens, whilst the various forms of meal derived therefrom, such as bran, middlings, sharps, etc., are well known. As is well known, wheat also forms the basis of certain biscuit meals which make the latter very useful as food for fowls. Variety of feeding is usually recommended, but it is surprising for how long wheat can be exclusively fed to the fowls without any bad result.

*Wheat Bran.* Bran is the outer part of the wheat kernels and its analysis proves it to be a very valuable food. With 11.4 of albumen bran can be used in all mashes, but it should be well scalded before use. It is cooling and acts as a laxity, whilst it will aid in the digestion of other foods. Hens kept on the Intensive System, are given a continuous supply of dry bran placed before them in hoppers. Where fowls are overfed, the use of bran will result in the balancing of the foods, and for this reason alone it can be recommended.

*Middlings.* This is the term used for the next layers of the wheat kernel, after the outer coating or bran has been taken off. These layers may include a little flour, for the wheat berry is going through the necessary process of manufacturing flour. Middlings contain more starch than wheat bran and when used with soft mashes, should be employed in conjunction with coarser products. This is advisable, as middlings are apt to irritate the mucous membrane, and if given alone might cause a stoppage of all food. Middlings are known in different parts of the country under various names. The following local terms stand for the by-products from flour in the shape of meals :—sharps, shorts, pollards, toppings, thirds, blues, boxings, seconds, etc.

*Bread.* This will naturally come under the heading of wheat, and it shows a good digestible analysis. Apart from the fact that it can be obtained cheaply from restaurants, etc., it is a valuable food for poultry. Bread should not be given in excess, and a good plan is to bake the stale bread in the oven until it is brittle and afterwards soak it for use in the mash.

*Wheat Screenings.* These represent the small or crushed wheat, screened from the wheat previous to the milling operation. It is a cheap food, but in selecting it, quality should not be overlooked. If the screenings contain too many husks and weed seeds, it should be discarded for better samples.

**MAIZE.** No other grain is so eagerly pecked up by the fowls than maize or Indian corn. Where mixed corn is thrown to the fowls, the latter will be seen to fight for the maize, which amply proves that they like the grain. In America, maize (or corn as it is there called), is to the poultry-keeper what wheat or oats is to the English poultry-keeper. Our American cousins, in fact, feed their fowls very often exclusively on this corn or maize. Despite the fact, maize is easily digested and assimilated and much liked by the fowls, it must be given with care. The analysis proves that maize contains 70.4 of carbo-hydrates, and so is a very fattening grain. For winter use it has its advantages when mixed with other grains, but to confined birds, maize must be fed sparingly. When cooked by steaming and flaking, part of the fat or oil passes away in the process, and many cooked foods on the market at the present day have the advantage over the raw grain, because the maize has been specially prepared as above. There are two kinds of Indian corn, *viz.*, white and yellow, and both have roughly the same analysis. Yellow maize is recommended as a feed to buff-coloured exhibition birds, with the white maize for white or light-plumaged birds intended for show purposes. Many authorities aver that maize affects the colour of the skin of table birds and also the colour of the egg yolk. For this reason, yellow maize should be used where rich coloured yolks are desired, and white maize where the white skin or flesh is *sine qua non* with birds being prepared for table.

**OATS.** This forms an excellent grain for poultry, but only in recent years have its claims been heard by utility poultry-keepers. Its analysis is an excellent one, and the ratio as narrow as 1 in 6. When buying oats, the purchaser should see that they are of good quality. Some samples of oats will be found to contain as much as 20 per cent. of husk or fibre, which has practically no feeding value whatever. It is a difficult matter to get good oats, but when the poultry-keeper meets with excellent samples, he should order a big stock to last him for a time. The oats sold by the average corn-dealer are usually of very inferior quality, being only suitable for utility rabbits. *Clipped* oats have a much less percentage of fibre than ordinary oats. In judging the quality of oats, then, let my reader be guided by the size and plumpness of the kernel. When fed to fowls for the first time, they are not very eager to partake of it, but soon get to like the grain.

*Ground Oats.* Oats are excellent for growing youngsters, and for this reason "Sussex ground oats" are in much request by fatteners of chickens for the table. It is doubtful whether there is a fattening meal to excel Sussex ground oats, which food is extensively used in the table poultry counties of Surrey and Sussex. The oats—both kernel and husk—are ground up by specially prepared millstones, resulting in the finished article of Sussex ground oats.

*Sprouted Oats.* There can be no more economical food than sprouted oats, and the person who first discovered this ingenious method of cheap feeding, has conferred a great benefit on those engaged in the poultry industry. In the chapter devoted to "intensive" feeding, I have dealt fully with the method of sprouting oats.

**BARLEY.** This is not a very popular grain with poultry-keepers, as it is not a good egg-producer. Not only is it difficult to digest, but it has a tendency to form fat. Fowls do not show a liking for barley, due no doubt to its being very husky.

*Barley Meal.* Barley Meal is used far too much by poultry-keepers as a foundation for the morning mash. It is a very fattening food and should not be given in excess. During the winter months, it may be occasionally used in the soft morning food, but there are other meals for general use that show a much better analysis.

*Sprouted Barley.* Barley can be sprouted in the same way as oats, and will prove more valuable as a food for poultry than when fed in the raw grain.

*Malt Culms or Malt Sprouts.* Malt sprouts and brewer's grains are by-products of barley and form an excellent foodstuff, being rich in albumen. When malted, barley is a great aid to digestion.

**RYE.** Like barley, this grain is not very popular with poultry-keepers, and if used at all, I would suggest its being sprouted. In this state it is a very good food and is much liked by the fowls.

**RICE.** Upon analysis, rice appears to be one of the poorest grains used by the poultry-keeper. Whilst being deficient in flesh formers, it has an excess of carbo-hydrates or starchy material. It is a popular food with breeders of Bantams, as it helps to keep the latter small—so necessary an item with the wee-ones. The only point in its favour is that it has a tendency to check diarrhoea.

*Rice Meal.* Unlike the raw kernel, rice meal is a very good feed, containing no less than 18 per cent. of albuminoids.

**BUCKWHEAT.** Buckwheat is a much neglected grain, no doubt due to its analysis, which shows an excess of carbo-hydrates. It is a most useful grain for winter use however, and can be mixed to advantage with other grains. Its value as a winter grain should not be forgotten ; its use enables the poultry-keeper to ring the changes on his grain feeds.

*Middlings.* Just as wheat has its two by-products, bran and middlings, so also has buckwheat. Of the two, buckwheat middlings show an excellent analysis, containing no less than 28.9 of albumen.

**SUNFLOWER SEEDS.** This is a very valuable food and on account of its excellent analysis, should be more largely used by by the poultry-feeder. Being rich in oil, it is most suitable for use during the moulting season, as it aids in the formation of the new feathers.

**BEANS AND PEAS.** These are very rich in albuminoids and should prove a valuable change feed for fowls.

**LINSEED.** This is very strong in albuminoids and is useful during the moult to aid the formation of the new feathers. It is an excellent conditioner, putting a gloss on the plumage, for which purpose it is extensively used by breeders of exhibition poultry.

**CHANGE FEEDS.** As being of service for what we might call " change " feeds, the following can be recommended :—millet, dari, hempseed, etc.

## WEIGHT OF PRODUCT PER BUSHEL.

Barley (ground), 42 lbs. ; brewers' grains (wet), 40 lbs. ; carrots, 40 lbs. ; beans and oats (ground)—equal parts, 33 lbs. ; middlings, 32 lbs. ; rye meal, 32 lbs. ; oats (ground), 30 lbs. ; brewers' grains (dessicated), 20 lbs. ; bran, 17 lbs. ; malt culms, 14½ lbs. ; hay (chaffed), 8 lbs. ; oat straw (chaffed), 5 lbs. ; oat chaff, 2½ lbs. ; salt, 65 lbs. ; lentils, 63 lbs. ; maize, 60 lbs. ; dari, 60 lbs. ; millet, 60 lbs. ; potatoes, 56 lbs. ; linseed, 52 lbs. ; cotton-seed meal, 51 lbs. ; bean meal, 50 lbs. ; maize meal, 47 lbs. ; mangolds, 45 lbs. ; swedes, 45 lbs. ; turnips, 45 lbs.

## MEASURES USED IN THE SALE OF WHEAT.

Quarter of 8 imp. bus., at London and throughout the country, coomb of 4 bus., at Beccles ;- load of 3 bus., at Sheffield, Doncaster ; load of 5 qrs., at Oxford, Cirencester ; load of 144 quarts, at Ulverston ; load of 5 imp. bus., at Bedford ; boll of 3 imp. bus., at Newcastle, Carlisle Darlington ; boll of 6 imp. bus., at Berwick, Duns, Kelso ; boll of 4 imp. bus., throughout Scotland ; bushel of 62 lbs., at Birmingham, Gloucester ; bushel of 70 lbs., at Liverpool, Manchester ; bushel of 75 lbs., at Chester, Shrewsbury, Market Drayton, Nantwich ; bushel of 80 lbs., at Monmouth, Abergavenny ; bushel of 65 lbs., at Aberystwith ; boll of 264 lbs., at Glasgow ; boll of 240 lbs., at Hamilton ; barrel of 280 lbs., at Dublin, Cork ; cwt. of 112 lbs., at Bedford, Newry ; cental of 100 lbs., at Liverpool ; windle of 220 lbs., at Preston ; hobbet of 168 lbs., at Denbigh ; 1 boll of oats = 8 bus. ; 1 boll of oatmeal = 140 lbs.= ½ sackful ; in Galloway, 280 lbs.—1 boll of oatmeal ; 1 boll ryegrass seed = 4 bus. of 24 lbs. = 96 lbs.

## GRAINS AND THEIR BY-PRODUCTS.

| Grain or By-Product. | Water. | Ash. | Albumen | Fibre. | Carbo-hydrates | Fats. | Albuminoid ratio |
|---|---|---|---|---|---|---|---|
| Indian Corn ... | 10·6 | 1·5 | 10·3 | 2·2 | 70·4 | 5·0 | 1 to 8 |
| Maize Meal ... | 15·0 | 1·4 | 9·2 | 1·9 | 68·7 | 3·8 | 1 to 8 |
| Pop Corn ... | 10·7 | 1·7 | 11 6 | 1·8 | 69·2 | 5·2 | — |
| Whole Wheat ... | 10·5 | 1·8 | 11·9 | 1·8 | 71·9 | 2·7 | 1 to 6 |
| Wheat Bran ... | 11·9 | 5·8 | 11·4 | 9·0 | 53·9 | 4·0 | 1 to 4 |
| Wheat Middlings ... | 12·1 | 3·3 | 15·6 | 4·6 | 60·4 | 4·0 | 1 to 4 |
| Wheat Screenings ... | 11·6 | 2·9 | 12·5 | 4·9 | 65·1 | 3·0 | 1 to 5 |
| Bread ... | 31·2 | — | 6·9 | — | 44·2 | 0·9 | — |
| Oats (whole or ground) ... | 11·0 | 3·0 | 11·8 | 9·5 | 59·7 | 5.0 | 1 to 6 |
| Oatmeal ... | 7·9 | 2·0 | 14·7 | 0·2 | 67·4 | 7.1 | 1 to 5½ |
| Rolled Oats ... | 8·5 | 1·9 | 15·0 | 0·6 | 66·0 | 8·0 | — |
| Chipped Oats. ... | 11·2 | 2·8 | 12·0 | 7·4 | 61·6 | 5·0 | — |
| Barley ... ... | 10·9 | 2·4 | 12·4 | 2·7 | 69·8 | 1·8 | 1 to 6 |
| Barley Meal ... | 11·9 | 2·6 | 10·5 | 6·5 | 66·3 | 2·2 | 1 to 6 |
| Malt Culms ... | 10·2 | 5·7 | 23·2 | 10·7 | 48·5 | 1·7 | 1 to 2 |
| Buckwheat ... | 12·6 | 2·0 | 10·0 | 8·7 | 64·5 | 2·2 | 1 to 7 |
| Buck Bran ... | 10·5 | 3·1 | 12·4 | 31·9 | 38·8 | 3·3 | — |
| Buck Middlings | 13·2 | 4·9 | 28·9 | 4·1 | 41·9 | 7·0 | — |
| Peas ... ... | 14·0 | 2·6 | 20·2 | 14·4 | 51·1 | 1·2 | 1 to 2 |
| Peameal ... | 10·3 | 2·5 | 23·0 | 10·0 | 48·5 | 2·0 | 1 to 2 |
| Rye ... ... | 11·6 | 1·9 | 10·6 | 1·7 | 72 5 | 1·7 | 1 to 7 |
| Millet ... ... | 14·0 | 3·3 | 11·8 | 9·5 | 57·4 | 4·0 | 1 to 5½ |
| Beans ... ... | 13·5 | 3·0 | 25.5 | 10.0 | 46.5 | 1.5 | 1 to 2 |
| Soy Beans ... | 10·8 | 4·7 | 34.0 | 4.8 | 28.8 | 16.9 | — |
| Rice ... ... | 11·4 | 0 4 | 7·6 | 0·2 | 79·2 | 0 4 | 1 to 10 |
| Sunflower Seed | 8·6 | 2·6 | 16·3 | 29·9 | 21·4 | 21·0 | 1 to 4 |
| Linseed Meal ... | 9·2 | 5·7 | 32·9 | 8·9 | 35·4 | 7·0 | 1 to 1½ |
| Cottonseed ... | 10·2 | 3·5 | 18·4 | 23 2 | 24·7 | 19·9 | — |
| Cottonseed Meal | 8·2 | 7·2 | 42·3 | 5·6 | 23·6 | 31·1 | |
| Sorghum Seed ... | 12·8 | 2·1 | 9·1 | 2·6 | 69·8 | 3 6 | — |
| Dari ... ... | 12·5 | 1·3 | 10·0 | 3·3 | 68 0 | 4 0 | 1 to 6 |
| Hempseed ... | - | - - | 10·0 | — | 45·0 | 21·0 | 1 to 9 |
| Lentils ... ... | 14 0 | | 23·0 | — | 53·0 | 1·5 | 1 to 2 |

CHAPTER V.

# ANIMAL FOODS AND THEIR VALUE.

MEAT MEAL FOR EGG-PRODUCTION—VALUE OF FISH MEAL—USE OF SKIM MILK—HOW TO FEED GREEN BONE—COMPOSITION OF ANIMAL FOODS.

AS there are not sufficient albuminoids in any combination of grain to enable a hen to lay properly, animal food of some sort is necessary. This can be provided in several ways, as explained below.

**MEAT SCRAP.** Meat scrap in some form or other is necessary, as it acts as a good substitute for animal matter, under which heading comes insects, worms and grub life. Butchers' offal cleaned, boiled and finely cut up is a good animal food, but should be quite fresh when purchased.

**MEAT MEAL.** Meat Meal is almost indispensable for heavy egg-production, and the process of preparation is by first cooking the raw material by steam pressure and then removing the fat. The moisture is then removed, and the finished article ultimately represents a well screened meat meal. Meat Meal is used on most of the big egg farms in this country with most satisfactory results and even the small poultry-keeper cannot afford to omit it from his menus during the winter.

**BONE MEAL.** Bone meal is prepared by grinding up the bones after the meat has been extracted, and is a most useful feed for egg-production and growth in young chickens. The dried crushed bone is very strong in albumen and ash, which make it a very useful feed for the purposes mentioned above. Bone meal should always be fed to young chickens to help build up the framework of the body.

**GREEN BONE.** To prepare this, the green bone should be purchased fresh from the butcher's daily and ground up in a bone-cutter. It should be given fresh, but only in small quantities, preferably at mid-day. It is a most useful food for egg-production, being very rich in mineral matter. It is very stimulating, and many authorities are agreed that it is inadvisable to give green cut bone to the breeding stock. In any case it should be fed within reason, an excess being harmful.

**FISH MEAL.** This is rich in albuminoids and has been proved to be an excellent ingredient for inclusion in an egg-producing diet. The growing popularity of fish meal is sufficient evidence of its efficacy for this purpose, and it is to be noted that the prejudice that once existed has been entirely removed by the extraction of the oil from the fish, of which the best grades of fish meal are now prepared.

**MILK.** Milk is a useful and cheap feed, and whilst supplying the birds with protein, it can be easily and quickly digested. On a well known Derbyshire poultry farm—Mrs. Alfred Swingler's, to wit—milk is fed to all the fowls in earthenware vessels, and at the time of my visit, it would be impossible to imagine a healthier stud of birds.

**SKIM MILK.** Skim milk should always be used when it can be cheaply procured. The morning mash should be moistened with it, whilst it may also be given the fowls to drink.

## COMPOSITION OF ANIMAL FOODS.

| Foods | Water | Ash. | Albumen. | Fibre. | Carbohydrates. | Fat. |
|---|---|---|---|---|---|---|
| Ground Bone (dry) ... | 8·19 | 59·95 | 31·36 | — | — | 3·50 |
| Green Cut Bone... | 38·94 | 26·12 | 20·37 | — | — | 11·67 |
| Meat Scraps (high grade) ... | 10·70 | 4·10 | 60·2 | — | — | 25 |
| Meat Scraps (low grade) ... | 15·40 | 2·50 | 45 | — | — | 37·1 |
| Pork Scrap ... | 11 | 2·2 | 55 | — | — | 31·8 |
| Fresh Fish ... | 44 | 1 | 10·5 | 42 | — | 2·50 |
| Fish Scrap (varies) ... | 5—10 | 2—8 | 34—50 | — | — | 17 |
| Milk ... ... | 87·2 | ·6 | 3·6 | — | 4·9 | 3·7 |
| Skim Milk ... | 90·6 | ·7 | 3·1 | — | 5·3 | ·3 |
| Buttermilk ... | 90·1 | ·7 | 4 | — | 4·0 | 1·2 |
| Cheese ... ... | 40·6 | 3·4 | 23·7 | — | 1·7 | 30·6 |
| Horseflesh ... | 74·3 | 1·4 | 21·7 | — | — | 2·6 |

## CHAPTER VI.

# GREEN FOODS, ETC., AND THEIR VALUE.

ALFALFA MEAL AND CLOVER MEAL—THE USE OF POTATOES—NEED FOR GRIT AND OYSTER SHELL—CHARCOAL AS A CONDITIONER—HOW TO FEED GREENSTUFF—COMPOSITION OF GREENSTUFFS, ETC.

GREEN foods are usually met with in two forms, *viz.*, in the dry and in the green state. In the dry form they are finely cut for use in the morning mash in order to supply bulk to the menu.

**ALFALFA MEAL.** Alfalfa hay is found both in its green state and meal forms and is an invaluable feed for use in the morning mash during the winter. The American farmer has, for a long time, proved the value of alfalfa and feeds it to his cows and horses as well as fowls. Of late, poultry-keepers this side the Herring Pond have turned their attention towards it and those who have used it, speak highly of its merits. Although weighing very light, alfalfa meal, when scalded, is quite as bulky as bran and swells to several times its bulk. Viewed from this light, it is a very economic food. Besides being a most useful egg-producing food, alfalfa meal is very easily digested. When fed in its green state, alfalfa should be cut up into ¼ and ½ inch lengths. No doubt in the near future this will be a very popular feed over here, and poultry-keepers will grow their own supply on the farm.

**CLOVER.** Like alfalfa, clover can be fed in its two forms, *viz.*, green and dry. Its value as an egg-producing feed has only just been discovered over here, despite the fact that our American cousins have long been praising and using it. When in its dry form, it is very rich in albuminoids and mineral matter, and its analysis proves how handy it is for balancing a ration. Before use in the mash, clover hay should be scalded with boiling water and allowed to bulk.

**SWEDES, Etc.** Mangel-wurzels and swedes are very valuable forms of root-crops and come in handy for use during the winter months when the commoner kinds of greenstuff are scarce. The usual practice is to feed the tops of the mangel-wurzels, etc., green, afterwards storing the roots in beds of earth, etc., for winter use. The roots may be cut in half and thrown down in the run for the fowls to peck at. Another good plan of feeding such roots is to hammer a good sized nail first through the mangel-wurzel and then into a heavy board. This arrangement will help the birds to peck out the inside of the root.

Carrots, turnips and parsnips are also much relished by the fowls and such roots should be sliced up finely in the cutting machine.

**POTATOES.** Although the analysis of potatoes is a poor one, hundreds upon hundreds of poultry-keepers feed them in large quantities to their fowls. I quite admit that the latter show more than a liking for potatoes fed in the mash, but they should always be fed very sparingly.

**LETTUCE.** This is a very succulent green food and acts as a blood tonic. It is certainly a rather dear food, but when given to young chicks, it will be much relished. In such cases it should be cut up finely.

**ONIONS.** These have their special value as a food for fowls, but must be given in limited quantities. The value of onions as a tonic, for both old and young stock, cannot be over-estimated, and for this very reason alone,I can well afford to recommend their use. The drawback to the feeding of onions in unlimited quantities, is that they naturally taint the eggs laid by hens thus fed. The onion tops should be chopped up very finely for the chickens, whilst for the adult stock, the whole onions may be cut up finely and mixed with the mash.

**CABBAGE.** This is another useful green food, and is used by most poultry-keepers. Leaves of broccoli, cauliflower and brussels-sprouts stems (cut down the centre) also make suitable green foods. In giving green foods to the fowls, the best plan is to place the leaves, etc., in a string bag, and suspend the latter from the roof of the run where possible. The birds by this method have something to tug at, and are able to peck off small pieces of the greenstuff. When the fowls have had their feed of greenstuff, the refuse should be removed from the run, else the leaves will rot and prove harmful.

**SALT.** Chloride of sodium is a necessary constituent, and although it is to be found in most foods, some authorities recommend the use of one tablespoonful of salt to every flock of 100 birds. Salt should be given in the soft mashes, but should be dissolved in the water with which such mashes are moistened and not mixed in dry. This method ensures each bird getting its proper share.

**GRIT.** Grit may be classified under two headings, *viz.*, oyster shell and sharp flint grit. The former is necessary for the formation of egg-shells, which contain a good percentage of lime. The flint grit is to aid the birds in grinding up their food, and the sharper it is the better.

**MUSTARD.** This is a most useful auxiliary food, and has been proved to aid the digestion. It should play its part during the winter, a teaspoonful of mustard for every dozen birds, given in the warm wash, two or three times a week during cold weather, being the necessary dose.

**WATER.** There are many reasons why special attention should be given to the drinking water. In the first a cursory glance at the analysis of the two finished articles (the egg and the hen) will show that these are composed of a very large percentage of water. Then again, the water has its value in the manner of digestion by dissolving the particles of food ; it also regulates the temperature of the bird's body. The drinking water must be perfectly fresh, and any stagnant water on the farm should be wired off, otherwise the eggs will become tainted. Drinking water should never be allowed to run short, and the up-to-date poultry-farmer will make sure of his water supply for the fowls by having the water laid on near the breeding pens.

**CHARCOAL.** Powdered charcoal is a good conditioner, as it purifies the system and keeps the birds healthy. It is not used very extensively over here, although in the big Laying Competitions over the Water, supplies are always kept before the birds. Charcoal is naturally very rich in mineral matter, and should be given dry in feeding hoppers. It should always be before the birds, and can be especially recommended for Intensively-kept hens.

## COMPOSITION OF GREEN FOODS, Etc.

| Foods. | Water. | Ash. | Albumen. | Fibre | Carbo-hydrates. | Fat. |
|---|---|---|---|---|---|---|
| Potatoes | 78·9 | 1·0 | 2·1 | 0·6 | 17·3 | 0·1 |
| Mangel Wurzels | 90·9 | 1·1 | 1·4 | 0·9 | 5·5 | 0·2 |
| Cabbage | 90·5 | 1·4 | 3·8 | 1·5 | 2·4 | 0·4 |
| Onions | 87·6 | 0·6 | 1·4 | 0·7 | 9·4 | 0·3 |
| Onion Tops | 91·0 | 1·1 | 3·9 | 3·0 | 0·8 | 0·2 |
| Lettuce | 95·9 | 0·8 | 1·6 | 0·5 | 1·0 | 0·2 |
| Alfalfa (green) | 80·0 | 1·80 | 4·90 | 4·70 | 7·90 | 0·07 |
| Alfalfa (dry) | 11·9 | 7·13 | 14·12 | 27·09 | 37·34 | 2·42 |
| Grass Clippings (green) | 76·40 | 2·40 | 2·30 | 4·1 | 13·8 | 1·0 |
| Grass Clippings (dry) | 15·3 | 5·5 | 7·4 | 27·2 | 42·1 | 2·5 |
| Clover (green) | 70·8 | 2·1 | 4·4 | 8·1 | 13·5 | 1·1 |
| Clover (dry) | 10·0 | 8·1 | 16·32 | 17·84 | 45·99 | 1·75 |
| Carrots | 88·6 | 1·0 | 1·1 | 1·3 | 7·0 | 0·4 |
| Artichokes | 80·0 | 1·0 | 2·5 | 0·8 | 15·5 | 0·2 |
| Turnips | 90·5 | 0·8 | 1·1 | 1·2 | 6·2 | 0·2 |
| Beet Pulp (dry) | 8·0 | 5·4 | 9·5 | 15·4 | 61·3 | 0·4 |
| Beet Pulp (wet) | 89·8 | 0·6 | 0·9 | 2·4 | 6·3 | — |
| Green Oats | 62·2 | 2·5 | 3·4 | 11·2 | 19·3 | 1·4 |

## CHAPTER VII.

# SUMMER *versus* WINTER FEEDING.

HENS IN SEMI-CONFINED RUNS—HENS ON FREE RANGE—WARMING THE GRAIN—VALUE OF MUSTARD—GRIT IN WINTER—SUITABLE GRAINS FOR SUMMER AND WINTER USE

THE methods of feeding laying hens in the winter naturally will not apply equally as well for the summer months. For this reason, the person who is acquainted with the compositions of the various grains and foods, will be the better able to supply those the laying hens require at different periods of the year.

**SUMMER FEEDING.** The question of suitable foods for summer use, will naturally depend upon the environment—as to whether the fowls are on free range, totally confined, or semi-confined. In the first place, we will consider those hens that are kept on free range and have the run over grass land throughout the summer months. As can only be expected, these birds will be kept under natural conditions and will be able to find a good proportion of their food. Insect and grub life abound in the summer, and as such go to make the natural food for the hen, she will take great care that she devours all the natural food possible. Such hens will require a wider ratio of albuminoids than the 1 in 5, previously recommended for the laying hen, and this may be as high as 1 in 6.

We will put it in a simpler way. Supposing that this natural food, *viz.*, insect life, etc., devoured by each hen on free range during the summer, could be added to the rations recommended for summer use, it can be easily seen how the ratio of the whole would be narrowed down to the 1 in 5. As this natural food will be very rich in albuminoids, and the fowls will not require foods so rich in fats, the ratio can safely be higher or wider than that advised for winter feeding.

*No Morning Mash.* During the summer months then, two meals *per diem* will be sufficient to keep the hen in health, and her organs in good working order. As three feeds are given daily during the winter months, one must now be dispensed with, and that the mid-day meal. We must re-make up our menu sheet, however, for a morning mash is not necessary. The following might be recommended as a suitable summer menu *for birds on free range.*

| | | |
|---|---|---|
| 4 parts Wheat. | Oats. | By equal measure or alternately. |
| ½ part Dari. | Wheat. | |
| ½ part Buckwheat. | | |

Such a menu would give a ratio of 1 in 6, which is not too wide.

*Semi-confined Fowls.* Fowls in *semi-confined* runs, *i.e.,* in the breeding pens, will require a slightly different menu to that advised for fowls on free or unlimited range, but the ratio should be a little wider than that of the winter rations. A morning mash may be given three or four times a week, whilst it will be advisable to revert to the three-meals-a-day plan of feeding. As a mid-day feed, grain may be given on those days when the mash is provided with animal food or green food at noon on alternate days. The table given below will illustrate my meaning :—

*On Monday, Wednesday, Friday and Sunday.*

| MORNING. | NOON. | EVENING. |
|---|---|---|
| Soft Mash | Grain. | Grain. |

*On Tuesday, Thursday, Saturday and subsequent) Monday.*

| MORNING. | NOON. | EVENING. |
|---|---|---|
| Grain. | Animal Food or Greenstuff. | Grain. |

The soft mash should be given cold during favourable weather and may consist of :—

2 parts Cooked Vegetables
1 part Bran
2 parts Middlings

with an occasional change to

2 parts Cooked Vegetables
1 part Bran
2 parts Oatmeal or Biscuit Meal.

1. On those days that the morning mash is given, the mid-day feed may consist of wheat, dari and buckwheat, about 1 oz. of the mixture being allowed each bird. At night, oats and wheat can be given.

2. On alternate days, the wheat, dari and buckwheat may be given as the morning feed, with oats at night and about ½ oz. of meat or fresh cut bone per bird at noon.

It is not a wise plan to keep to hard and fast rules in grain feeding and so in the case of No. 2, wheat can occasionally be transposed to the evening feed, and the oats brought into the morning feed with the dari and buckwheat. Again, in the case of No. 1, where oats and wheat are advised for the evening ration, the changes can be rung on the two grains, the wheat being occasionally dropped on the day that this grain is due for the next morning's meal. Oats can be treated in like manner.

**WINTER FEEDING.** During the winter months, we must make out a menu that comes near the 1 in 5 ratio. Owing to inclement weather, the hen requires suitable food to keep up the temperature of her body and provide the necessary energy to keep the bird active and fit. Grub life will be scarce, and so foods rich in albumen must be brought into play.

*On Free Range.* Birds on unlimited range should be sheltered from unfavourable winds and storms. Shelters made from hurdles can be quickly and cheaply constructed, whilst the tops can be thatched. If the inside is well bedded down with litter, the grain can be scattered therein to enable the birds to obtain sufficient exercise. Clover hay is very rich in albumen and carbo-hydrates, and it can be cut into $\frac{1}{8}$ and $\frac{1}{4}$ inch lengths, scalded, and afterwards added to the soft mash. Fish meal also has a high percentage of albumen, as has meat meal, so that the poultry-keeper should have little difficulty in arranging his menus.

The following, in suitable proportions, will make useful winter rations for the morning feed of birds on free range :—

Bran
Biscuit Meal
Clover Hay
Meat Meal
Middlings
Cooked Green Vegetables.

or

Bran.
Fish Meal.
Clover Hay.
Biscuit Meal.
Middlings.
Cooked Green Vegetables.

In either case, the clover hay, bran and biscuit meal should be scalded before use and the whole dried off with the middlings.

*Noon Feed.* Birds kept strictly on free range do not necessarily require a meal at mid-day, although in very cold weather, a little cooked meat or lights, about $\frac{1}{2}$ oz. to each bird, may be given at noon. Failing this, and other days when the weather is unfavourable, a little small corn can be given.

*Evening Grain.* The evening feed of grain may consist of wheat, oats, maize, buckwheat, dari and hempseed. Variety of grain feeding is everything where egg-production is concerned, and so the changes can be rung on the above grains.

*Semi-confined Fowls.* Strictly speaking, hens that have the run over grass land, without being confined within reason, are termed as being on "free range." Hens that are kept in grass enclosures, such as the breeding birds, will for my purpose come under the heading of "semi-confined" stock. Such birds, although they have access to a grass run, are naturally kept within bounds and so are not quite so well off as their sisters who are kept, say, on the colony system and can roam where they like. Birds kept in semi-confined runs, will therefore, require a good supply of animal food during the winter months and must have plenty of scratching exercise. The morning food may be after the manner of that recommended for birds on free range. At mid-day, a little animal food must be provided. A little cooked meat (about ½ oz. to 1 oz. per bird) or fresh cut bone (½ oz. per bird) may be given with good results. As the evening grain, suitable variety can be obtained from the following :—wheat, oats, maize, hempseed buckwheat and dari. Oats and wheat can be taken as the foundation grains, the others being fed in small quantities. So long as the poultry-keeper aims at a narrower ratio than that in use during the summer, he should get plenty of eggs.

**VALUE OF MUSTARD.** As previously stated, mustard is a good auxiliary for winter use, and if given two or three times a week in the soft mash, the hens will relish same. The dose should be about 1 teaspoonful for every dozen fowls. Well mix the mustard with the other ingredients when dry, so that each bird will be sure of her share.

**GRIT IN WINTER.** Hens must be supplied with a sufficient quantity of grit, both oyster shell and sharp flint grit, and these should be always before the birds. Place the grit in shallow boxes and nail the latter on the outside of the shed. When the ground is hard with frost, extra attention must be given to the supply of grit and the poultry-keeper should keep a strict eye on the grit boxes. The grit therein is apt to get frozen, so that the birds will be deprived of their feed of grit if the boxes are not attended to. When the grit is frozen, stir it up with a stick and even go to the trouble of throwing an extra supply amongst the litter of the house. Without grit the fowls cannot lay properly shelled eggs or even masticate their food.

**WARMING THE GRAIN.** During the winter, the poultry-keeper will find it a good plan partially to boil the wheat or other grain, feeding it to the fowls when comfortably warm. They much relish this change. On some days the grain can be merely soaked in warm water and thrown to the fowls after the water has been drained off.

## CHAPTER VIII.

# WET *versus* DRY FEEDING.

ROUGH FEEDING OF WET MASH—DRY MASH AND HOPPERS—FEEDING SYSTEMS COMPARED—SAVING LABOUR—HOPPER FEEDING OF GRAIN

THERE are very many systems of feeding adopted by poultry-keepers in different countries, and there would appear to be much room for experimental work to ascertain which methods give the best results. There are, roughly, two systems in use in this country, *viz.* : 1, Trough feeding of warm mash ; 2, Scratch, or ground feeding of grain. These are not the only ones, however, known to our Colonial friends for instance, and so it will be necessary to group the various methods of feeding under four headings :—1, Trough feeding of wet mash. 2, Hopper feeding of dry mash. 3, Scratch, or ground feeding of grain. 4, Hopper feeding of grain.

**TROUGH FEEDING OF WET MASH.** This system represents the feeding of the meals, etc. in troughs, and is the one practised by the English poultry-keeper. The ingredients of the soft morning food are mixed with hot water and a drying off meal to a crumbly state and fed warm to the fowls.

**DRY MASH AND HOPPERS.** The hopper feeding of the dry mash is quite different to that mentioned above. Here the ingredients are selected to make a balanced food, and the meals, etc., fed in their dry state in hoppers or self-feeding receptacles. Troughs would, of course, serve as hoppers, but there would be much waste as the fowls would scratch the feed over the sides of the trough on to the ground, where it would be wasted. The working principle of a food hopper is much like that of the drinking fountain. As the fowls devour the food, the same amount passes from the container into the feeding cup to replace that which has been eaten. I will deal with hoppers, etc., in a later chapter.

**SCRATCH FEEDING OF CORN.** The system of scratch or ground feeding of grain is that adopted by the average English poultry-keeper. It is the feeding of the grain in the litter for the hens to scratch for. Any plan of feeding where the grain was thrown on the ground for the fowls to scratch or look for, would come under the above heading.

**GRAIN AND HOPPER FEEDING.** Under this method of feeding, the grain is placed in hoppers or troughs instead of being thrown to the fowls. It is a plan that has proved very successful in the feeding of chickens, which are ever hungry and ready for food. For general use, it has not been found to answer in the case of laying hens, in fact not with any startling results. This plan of feeding, where the grain is always before the fowls in hoppers or troughs, must not be confused with the feeding of grain in automatic feeders. In the former case, the hens do not have to scratch for their corn, whereas in the latter case, the grain is automatically scattered in the litter and must be scratched for.

**FEEDING SYSTEMS COMPARED.** After analysing the advantages and disadvantages of the four systems of feeding just enumerated, many ideas have presented themselves to me. So far, the English poultry-feeder has contented himself with following the old method of feeding. He gives his fowls their soft, warm morning mash, and a good measure of grains to go to bed on, and considers that he has done his duty and deserves all the eggs he receives from his hens. He does not trouble to go further to the extent of experimenting with the best foods, like his American cousin, who is ever bringing out new surprises. If anyone suggested to him that he should have a hopper of bran always before his breeding stock, he would probably treat such a well-meant piece of advice with ridicule. Yet if the same person saw it in the press, he would quickly take the pill and follow the writer's advice.

At the present time there is much need for official data as to what are the best methods of feeding hens for heavy egg-production, and I am sure the Utility Poultry Club would confer a benefit on utility poultry-keepers in general if they could manage to run feed-tests in connection with their Laying Competitions. The latter are, of course, quite expensive enough, but the urgency for data on foods and their feeding from all points of view, ought to be considered at an early date. I am not speaking disparagingly of the U.P.C., for we all know what good work this Club is doing.

To return to our subject, those who favour the hopper feeding of the dry mash, claim that the system allows the hen to balance her own foods. The dry mash is easily digested, and being before the hens all day, they can go to the hoppers and select the meals they consider necessary to assist them in their egg-laying. Should the hens overfeed themselves, those who practise the system, advise the closing of the hoppers for a certain period during the day.

The hopper feeding of grain I am not in sympathy with, as the fowls should not be deprived of their scratching exercise, but I see no reason why chickens should not have cracked grain always before them in hoppers.

As regards the hopper feeding of dry mash, much can be said in its favour, for all will agree that it means a considerable saving in time, money and labour. We must, however, look to the results as arrived at under the dry mash and wet mash systems respectively, before saying which is the better. The dry mash has many admirers, which would go to prove that the principle is a good one.

Where hens are kept for egg-production in small flocks, the trough feeding of the wet mash will probably be the one to select, but no doubt things will be very much altered in the near future. The Poultry Fancy has recently received a fresh lease of life, as evidenced by the success of the Intensive System in general, and the Mammoth Laying Houses in particular. Many of our leading egg specialists have installed such Mammoth Houses on their farms, and this would point to the probable popularity at some future date of the drymash feeding in hoppers. Under this system, the labour in feeding is certainly reduced to a minimum, and no one will deny that to feed a warm mash to 1,000 layers kept in a Mammoth Laying House is no easy task.

Seeing then, how popular the hopper feeding of the dry mash is becoming, when used in conjunction with the scratch feed of grain, the two methods are certainly worth experimenting with.

## CHAPTER IX.

# FEEDING HENS KEPT ON THE INTENSIVE SYSTEM.

MAMMOTH LAYING HOUSES—HOPPER FEEDS—KEEP HENS BUSY—HOW TO SPROUT OATS—SYSTEMS OF FEEDING INTENSIVE HENS—SUMMER *versus* WINTER FEEDING—SEMI-INTENSIVE METHODS.

JUDGING by the popularity of the Mammoth Houses, as used for laying hens kept on the Intensive System, I should say that this plan of housing has a good future. Most of my readers have doubtless read sufficient matter on the Intensive System to know the general principles of same and so I need not start from the very beginning, but instead will confine myself to the question of feeding, etc.

**MAMMOTH LAYING HOUSES.** Not many years ago the keeping of hundreds or thousands (as the case may be) of laying hens in one house and so under one roof, was never dreamt of. Had any poultry-keeper suggested the idea then, however, he would doubtless have been considered insane. Directly the Mammoth Houses were introduced to the English poultry public, there was a general run on them, and from reports I have received from time to time, they have proved highly successful. To Mr. Randolph Meech, of Poole, Dorset, goes the credit of owning the largest laying house in the world. It has a capacity for 3,000 hens, is of the double-decker type and cost £450 to construct. Large henneries are very popular across the Herring Pond, where things are usually done on a big scale, but most of the henneries in the States accommodate 2,000 hens. There are many designs of these large henneries in use in this country. Some are of the double-decker type, where the hens are accommodated upstairs as well as downstairs, whilst others are of one floor only. A minimum of about three square feet of ground space for each hen is considered advisable in such houses.

*Corning* thinks that 2,000 birds can be kept profitably in one flock and one house. His own houses accommodate 1,500 layers, and his birds so kept, averaged 145 eggs each last season.

On the *Rancocas Poultry Farm,* New Jersey, there are over 38 large henneries containing 500 layers per house, or a total of 20,000 hens. The total yearly output has amounted to :—

500,000 marketed eggs.
92,210 eggs for sitting.
5,000 boilers.
7,000 layers sold, etc., etc.

These houses measure 100 ft. × 14ft. wide × 9½ ft. high in front and 4½ ft. high at back. One male is used for every twenty-five laying hens with hatching fertility 94½ per cent. A hen hospital is in use and this is an item that should be included on every up-to-date farm. The incubating capacity is something like 100,800 eggs which number can be incubated every twenty-one days. Hatching starts in January and continues up to July, 252 incubators each to hold 400 eggs being stocked.

These Mammoth Houses should prove a boon to egg farmers, but they requite careful handling as is only to be expected.

**KEEP HENS BUSY.** With hens kept in such numbers and *confined,* the poultry-keeper must keep an eye out for ailments, and treat any invalids directly they are noticed, removing them to separate quarters. Owing to their being confined, the hens must all be kept busy scratching away, and with this object in view, plenty of litter is placed on the ground. Sand, sifted soil and wheat or rye straw will make a good litter, 1½ inches of fine sand with 6 inches of straw on top being the supply recommended. It is best to allow the hens to chaff the straw as this will mean exercise. The grain is thrown down in the litter so that the hens can scratch for same. The litter should be regularly well raked over and occasionally passed through a sieve.

**DRINKING VESSELS, Etc.** The houses should face the South and no ground space whatever must be wasted. The dust baths should be placed on tables as should the drinking vessels, so that the hens can scratch away underneath. The nest boxes and perches are also fixed well off the ground for the same reason. The hens will require plenty of fresh water and many well-known Intensivists have water laid on inside their Henneries so that supplies can be pumped up as required. If any birds are found ailing it is wise to put a tonic in the drinking water.

**HOPPER FEEDS.** Bran (especially wheat bran) is recommended as a staple food for Intensive hens. It is given in the dry state in hoppers or troughs and is accessible at all times. If the hens get too fat the bran hopper is left open only for certain periods during the day. Other hoppers should contain grit, oyster shell and charcoal, as these materials should always be before the hens.

**SPROUTED OATS.** This is a very cheap feed and is recommended for Intensive hens. The sprouting box should measure about 2ft. × 1ft. and 1 lb. of dry oats should be the minimum quantity for such a box and 2 lbs. the maximum. Soak the oats for 24 hours in lukewarm water, then drain the water off and place the oats in a box to the thickness of one inch. No soil is necessary. Water the oats continuously with lukewarm water the surplus water draining off through holes pierced in the bottom of the box. Stir the oats with a stick but only until they begin to sprout. When they are two or three inches thick they are ready for feeding. Cut the mass—roots as well—into portions and feed same to the hens. It is best to keep the sprouting boxes in a warm room where the temperature is about 60°. After about seven days of sprouting the oats are ready for use and one square of the food is sufficient for each hen per day. Special racks can be made at home to hold the sprouting out boxes (the latter being of course shallow). The rack is very much after the style of a book-case, the shallow oat-boxes being slipped therein one above the other. Four lbs. of *dried* oats grown in an ordinary greenhouse have been known to make a total bulk of 18 lbs. 4 ozs. when sprouted.

**SYSTEMS OF FEEDING.** There are several systems of feeding hens kept in these Mammoth Houses but personally I think there is much room for improvement and experimental work. Many Intensivists carry out a plan of feeding similar to the following :—*Summer*, 8 a.m. grain feed ; 10 a.m. sprouted oats;

noon, wet mash; 5 o'clock, grains. *Winter*, early morning, wet mash followed by grain, etc. Others try green food as the first morning food in the summer, followed by a grain food about 11 o'clock, the wet mash at 2 o'clock and an evening feed of grain. In the winter the wet mash is given as the morning breakfast with grain feeds, etc. to follow. Where the wet mash is given in troughs, the latter should be kept well scoured out and made to hang on the wall when finished with.

**"RANCOCAS" SYSTEM OF FEEDING.** The system of feeding for *five hundred birds* as practised on the Rancocas Poultry Farm, New Jersey, is as follows:—

8 lbs. Bran.
7 lbs. Middlings.
7 lbs. Ground Maize and Oats.
4 lbs. Beef Suet.
5 lbs. Clover (chopped finely).
½ lb. Fine Oyster Shell.
3½ lbs. Linseed Meal.

This is mixed with water to a crumbly state and each bird receives one ounce of the mash. The clover is scalded before being mixed. This mash is given at 7 a.m., followed at 9 a.m. by scratching feed, consisting of:—

7½ lbs. Barley and
7½ lbs. (hulled) Oats.

Each bird receives ½ oz. About 11 a.m., greenstuff, chopped into lengths of half an inch, is fed, about 30 lbs. to each lot of 500 hens. The noon food is equal to the morning scratch food. The evening rations consist of 50 lbs. of wheat and cracked maize, and is given in troughs just before roosting time, so that the birds can have a sound feed without exertion.

**DRY MASH SYSTEM.** There is much to be said against the system of feeding Intensive hens regularly on a wet mash. Those who have had experience with laying hens know too well how the feeding of a warm morning mash is apt to make the hens lazy and inactive. To prove profitable as regards egg-production every Intensive hen must scratch for her living, as only by so doing will she keep in health and function properly. If the warm mash is given at all it should be placed before the hens in the afternoon or at mid-day and not early in the morning. Then again, each bird should not be allowed too much. A light feeding of wet mash followed by a light feeding of scratch feed will make the hens scratch

There is much to be said for the feeding of meals in their dry form and an Intensive friend of mine informs me that he has carried out this system of dry mash feeding with far better results than he derived from any other methods. It is a system that might be tried, and I can personally recommend it.

The first meal would be a scratch feed of grain, followed by a feed of greenstuff and another feed of grain at noon. During the afternoon the dry mash hoppers would be kept open and the last feed consist of grain. Many Intensivists keep the dry mash before the fowls all the day, whilst many others follow the dry hopper feeding of the grain at night, as practised on the Rancocas Poultry Farm. They contend that by this method the birds have a quiet feed at night, without any exertion, and go to bed happy and contented, without having been subjected to any undue scratching exercise. Those Intensivists who experiment with the various systems of feeding, finally adopting the one that gives the best results, will be more successful in securing full egg-baskets than their brothers who are content to feed on old-fashioned principles.

**SUMMER AND WINTER FEEDING.** Summer feeding will naturally differ slightly to that adopted in the winter. During the cold winter months heat-producing foods must be brought into the menus, whilst more animal food will be required. The grain feeding too will be slightly different, as maize, canary seed, hempseed, split peas, buckwheat, etc., can all be brought into play. A perusal of the earlier chapters of this little book will help the reader in selecting his foods. Milk can be given the fowls to drink in the winter.

**SEMI-INTENSIVE METHODS.** Many poultry-keepers who do not believe in confining their hens *in toto*, adopt the Semi-Intensive system of housing. Under this plan the hens are allowed the use of a grass run on fine days. They are not allowed out every day of the year and so the grass land is not over done. On the Semi-Intensive System, whilst the hens are out on the grass they will find plenty of grit and animal life, which must be borne in mind when the menus are being made up.

## CHAPTER X.

# FEEDING HENS IN CONFINED RUNS.

CLEANLINESS IN FEEDING—THE DRINKING WATER—NEED FOR EXERCISE—SUMMER RATIONS—WINTER RATIONS—GRIT HOPPERS—BRAN HOPPERS.

MY little text-book would be very incomplete if no provision were made for the Backyard Poultry-keeper. I have therefore allotted space to a separate chapter on the feeding of hens kept in small confined runs. With the average Backyarder, eggs are generally plentiful during the winter months, due to the fact I suppose, that the hens are not subjected to such hard knocks that come the way of those hens kept on the farm. the latter naturally have to battle against all kinds of weather conditions, many of which are altogether unfavourable to heavy egg-production. In the case of hens kept in Backyard runs, the fact that the birds are kept dry both underfoot and overhead, must carry weight during the winter months when eggs are at a premium. They are not affected in any way by cold, damp soil and are snug and cosy when the rain comes down. The hens do not have to run to shelter directly a storm threatens, whilst they have suitable protection from cold winds.

There are many backyarders, however, who have to complain of poor or empty egg-baskets during the winter months, which only goes to prove that *management* plays an all-important part in the case of hens kept in confined runs. The fact that the hens are kept in small numbers should ensure their being well managed, and I will give my own ideas on how such birds should be handled.

**CLEANLINESS IN FEEDING.** In the first place, the Backyard poultry-keeper must observe utter cleanliness in both housing and feeding. The morning mash should be fed in wooden troughs and these in turn should be made to hang on the wall when not in use. They must also be frequently well scoured out. When the fowls appear to have had their fill, the remainder of the soft mash should be taken away. Under no circumstances should the soft food be thrown down in the run to be soiled with either earth or droppings. Cleanliness must also be observed in the matter of housing. The internal fittings of the house, such as the perches, nest boxes, etc., should be movable so that they can be removed and scrubbed with water and soap regularly. The perches should be washed down with warm water and carbolic soap at reasonable intervals, whilst the nesting material must also be frequently changed. When the hens are moulting, the feathers should be taken out of the run daily ; this will prevent feather-plucking and other such vices.

**FEED EARLY.** Early feeding is essential especially during the winter when the Backyarder cannot expect eggs from his hens if he allows them to mope about with empty stomachs on cold mornings such as we experience from November onwards. The morning mash should be given the hens very early in such weather if the best results are to be obtained. It is an unwise policy to allow the hens to wait a long time for their morning feed—far better to set the alarum clock for half-an-hour earlier.

**WARMING THE WATER.** Having given the hens their warm morning mash, the next step is to see to the drinking water. As mentioned earlier in the book, the temperature of a hen's body is very high and so any sudden change in the temperature (inside the bird) will not be for the best. Doubtless my readers will have noticed how hens in confined runs will make for the drinking fountain directly they have devoured their warm breakfast. If there were allowed to have access to icy-cold water after a warm meal, our own common sense tells us that the birds would suffer harm. The wise poultry-keeper will therefore slightly warm the drinking water whilst the hens are eating their breakfast, so that those birds that run off to the water immediately after their feed will not take harm.

**THE DRINKING WATER.** A few words are perhaps necessary on the question of the drinking water. In the first place, far too many backyarders use ordinary household basins. These are of little service, being much more troublesome than they are worth nor do they hold sufficient water. A good sized earthenware drinking fountain costs very little and will stand a lot of knocking. I say *good-sized* as a small vessel that requires constant refilling is not to be recommended. Having purchased the drinking fountain, the next duty is to see that it is frequently cleaned out. If a few lead shots are placed therein, with a little water and the fountain shaken up and down, this will scour the inside. When in lay a hen will require plenty of water and as an egg consists chiefly of water, the latter must be fresh and clean. Stagnant water, or even sun heated water, will prove harmful. The drinking water should never be allowed to run dry, as the birds will only get very thirsty and overfill themselves directly the fountain of fresh water is placed before them.

**NEED FOR EXERCISE.** As the hens are confined, exercise in plenty is absolutely necessary. The most profitable hens are those that scratch the most and this should be borne in mind by all backyarders. Exercise too, can be provided in more ways than one. The runs should be composed of soil which should always be kept soft and scratchable by being constantly raked over. Many backyarders throw ashes down in the run but these will soon make the run untidy. Pure garden soil cannot be bettered for use in the run, and the ashes can be placed in a box in the run for dusting purposes, etc. The deeper the box the better, as the depth will prevent the hens from scratching the ashes over the sides of the box into the run. In the sleeping house itself, the soil should be kept soft and well raked over, dry leaves making a suitable litter. When the leaves are falling fast, the poultry-keeper should collect a good supply for winter use. When dried such leaves make admirable litter. The grain should always be well raked into the soil of the run, to promote scratching exercise, whilst during the winter months it is a good plan to bury a few handfuls of corn in the run for the fowls to scratch away for same, directly they leave the perches early the next morning. If the green stuff is suspended from the roof of the run this will also promote exercise.

**GRIT.** Hens must have grit and of the right kind. Two boxes should be nailed to the back of the run at a convenient height, the one containing sharp flint grit, and the other oyster shell.

**VALUE OF GREEN FOODS.** With the hens kept in total confinement, greenstuff in abundance must be given. A string bag will make a good receptacle, and this should be hung up to the top of the run so that it suspends to within two feet or so of the ground. The hens will thus get exercise in jumping up at the greenstuff. Leaves from cabbages, broccoli, lettuce, etc., can be placed in the string bag, the ends of the latter being pulled tightly together. The fowls will then be able to obtain the greenstuff in small pieces such as they require.

**SUMMER FEEDING.** During the summer months the fowls must not receive too nourishing a diet, and foods that are heat-giving must not be given in excess. Should this happen, the hens will soon go broody or lay on an excess of internal fat, which will mean fewer eggs. A lazy hen will never be a prolific layer, so the utilitarian's object should be to keep his hens a trifle on the hungry side so that they will be active. For the summer use the morning meal might consist of :—

1 part Bran.
2 parts Middlings.
1 part House Scraps.
2 parts Cooked Vegetables.

It may be advisable to give the mash say, three days a week when the weather is warm, grain being given on other mornings. It can also be given cold during very hot weather. In feeding, much must be left to the poultry-keeper's common sense.

Green food is necessary and this should be given at mid-day. The backyarder should make full use of sprouted oats, as this is a very cheap feed. Sprouted oats can be fed at noon.

As regards the grains for summer use, wheat and oats should form the staple feed.

**WINTER FEEDING.** For winter feeding, we shall require a narrower ratio than that used throughout the summer. Three meals per day will be necessary, and foods rich in albuminoids should be included in the morning mash. The following foods can be used in suitable proportion to obtain with the noon feed and the evening grain, a ratio aproximately 1 in 5 :—

MORNING MASH.

| | | |
|---|---|---|
| Bran | | Bran. |
| Middlings | | Middlings. |
| Clover Hay | or | Meat Scraps. |
| Meat Scraps | | Cooked Vegetables. |
| Peameal | | Peameal. |

At mid-day a little meat, green cut bone and green food can be given alternately. Swedes, mangel-wurzels, turnips, etc., will be useful as green food for winter use.

As regards the evening corn, such heat-giving grains as maize, buckwheat, hempseed, etc., can be added to the staple oats and wheat, a good variety of feeding being easily obtained. The grain can frequently be partially boiled and given fairly warm in inclement weather ; this change will be appreciated. A good plan is to soak the grain in a bucket of warm water, throwing the warm grain down to the fowls after drawing off the water.

**USE OF BRAN.** In addition to the two boxes of grit, a third box should be attached to the back of the run, in which dry bran is placed. Dry bran makes a good auxiliary food, and does good service in aiding in the digestion of other foods. The bran hopper should have a lid attached thereto, as recent experiments have proved that it is inadvisable to leave the bran before the hens all the day. The lid of the bran hopper should be opened about dinner-time for two hours or so and the hens allowed to have a feed when they desire to do so. The lid should then be closed after the two hours have elapsed. If the hens have access to the bran hopper for a longer period without becoming lazy, then no harm will be done. Here again the poultry-keeper will be the best judge.

## CHAPTER XI.

# FEEDING HEAVY EGG-PRODUCERS.

WELL-KNOWN PERFORMANCES—“LADY CORNELL,” THE 257 EGG PULLET—“BELLE OF JERSEY,” A 246 EGG PULLET—A 291 EGG HEN—THE “CORNELL” SYSTEM OF FEEDING.

IN the feeding of hens for heavy egg-production, one can learn much from the methods adopted with regard to well-known individual performers. A prolific hen will lay in one year many times her body weight in eggs, whilst to do this, she must eat roughly *thirty* times her body weight in food, *i.e.*, on an average Let us refer to the record of “Lady Cornell,” the little white Leghorn hen that has made Professor James E. Rice, of the Cornell University, so well-known amongst utility poultry-keepers.

**“LADY CORNELL.”** This little hen, weighing but 3·2 lbs., laid 257 eggs in her pullet year, having a total weight of 29½ lbs., *i.e.*, 9·2 lbs. of eggs for each lb. of live weight. She consumed food containing 88·1 lbs. of dry matter, and produced eggs containing 10·11 lbs. of dry matter, or 7·17 lbs. for each lb. of dry matter in her body. In her second year she yielded 200 eggs, making a total of 457 eggs in two years. “Madam Cornell,” one of her companions, laid 245 eggs in her pullet year, and 130 in her second year, a total of 375 for the two years, weighing 46.8 lbs.

Authorities tell us that every normal hen has within her body at birth, from 1,500 to 3,000 ova. To get the best of results from a hen she must be happy and well nourished. “Lady Cornell's” balance sheet reads :—

“LADY CORNELL.”

| | |
|---|---|
| Body weight (lbs.) ... ... ... | 3.2 |
| Food consumed (lbs.) ... ... ... | 110.0 |
| Eggs laid in one year ... ... ... | 257 |
| Weight of eggs laid (lbs.) ... ... | 28.8 |

### FINANCIAL STATEMENT.

| | |
|---|---|
| Cost of feed | $ 1.66 |
| Labour and interest | 1.00 |
| Total debit | 2.66 |
| Value of eggs | 7.43 |
| Value of manure | .29 |
| Total credit | 7.72 |
| Net profit | 5.06 |

The method of feeding "Lady Cornell" and the other heavy egg-producers at the Cornell College is as follows :—

| WINTER. | lbs. | SUMMER. | lbs. |
|---|---|---|---|
| Wheat | 60 | Wheat | 60 |
| Maize | 60 | Maize | 60 |
| Oats | 30 | Oats | 30 |
| Buckwheat | 30 | | |

This whole grain mixture is fed morning and afternoon in the straw litter.

### HOPPER FEED.

The following mash is fed *dry* in a hopper, the latter being kept open during the *afternoon* only :—

WINTER and SUMMER.

| | lbs. |
|---|---|
| Maize meal | 60 |
| Wheat middlings | 60 |
| ,, bran | 30 |
| Alfalfa meal | 10 |
| Oil meal | 10 |
| Beef scrap | 50 |
| Salt | 1 |

The fowls should eat about one-half as much mash by weight as whole grain. Regulate the proportion of grain and ground feed by giving a light feeding of grain at the morning, and about all they will consume at the afternoon feeding (in time to find grain before dark). In the case of pullets or fowls in heavy lay, Professor Rice recommends restricting both night and morning feed to induce heavy eating of dry mash, especially in the case of hens. This fact would emphasise the value of a dry mash for heavy egg-producers. The above rations are supplemented with beets, cabbage, sprouted oats and green clover, unless the birds are on grass runs. Grit, oyster shell, bone and charcoal are always before the hens. The hens should consume about two-thirds grain to one-third dry mash, which should contain a liberal allowance of meat.

**"BELLE OF JERSEY."** This was another prolific white Leghorn hen which, weighing but 3.8 lbs., laid 246 eggs in her pullet year, weighing 29.5 lbs. Her record reads :—

| | |
|---|---|
| Body weight (lbs.) | 3.8 |
| Food consumed (lbs.) | 118.5 |
| Eggs laid in one year | 246 |
| Weight of eggs laid (lbs.) | 29.5 |

**291 EGG-HEN.** Professor James Dryden, of the Oregon Experiment Station, has also made us acquainted with a cross-bred hen that laid 291 eggs in her pullet year. This hen was hatched on April 29th, and began laying at the early age of 5½ months. Her eggs weighed some 36 lbs., nearly nine times her own weight. It is a pity that we have not been given the *menu card*, but I understand that she was fed with a flock of fifty hens. She was a frequent visitor to the beef scrap hopper, went to the mash two or three times a day, went straight to the drinking fountain after laying an egg, frequently nibbled at the green food which was always accessible, and immediately walked to the scratching shed each time for a scratch. This will give an idea of how busy the life of a heavy egg-producing hen should be.

No. C. 521 is a hen that is related to C. 543, and this bird, under the careful eye of Professor Dryden, laid 300 eggs in her first year of laying. This total constitutes a world's record, and is about 18 more than the total number of eggs laid by a hen that has for many years now held the world's record for the first year of laying. The bird was hatched on April 29th, and began to lay on October 16th of the same year. She is bred ⅞ Leghorn, and ⅛ Barred Rock.

**OTHER HEAVY EGG-PRODUCERS.** It is on record that a White Rock hen has produced 281 eggs in twelve months, whilst a Barred Rock at Guelph, Canada, held the world's record for many years with a total output of 282 eggs for the same period. This heavy laying only shows what can be done where special line-breeding and judicious feeding are the order of the roost. Other records include that of a Leghorn hen, which in seven years laid a total of 969 eggs, whilst a Braekel hen is credited with 606 eggs in four years. Prolific layers have big appetites, but these must be carefully kept within their bounds. An excess of ill-balanced foods will naturally do more harm than an excess of well-balanced foods.

## CHAPTER XII.

# OVER-FEED *versus* UNDER-FEEDING.

FOOD PER HEN—FOOD FOR SEASONS—FEEDING WARM MASHES —A GOOD EVENING FEED—WHEN HENS ARE FAT—TO REDUCE SURPLUS FAT.

IT would not be very short of the mark if I said that nearly 40 per cent. of poultry-keepers over-feed their fowls. It is the easiest thing imaginable for a hen to lay on fat internally although where the poultry-keeper carefully selects his menus, such trouble is reduced to a minimum.

**FOOD PER HEN.** It is very difficult to lay down a definite rule as to how much food per meal a hen should have. So much depends upon the breed in question, that the feeder himself is the best judge. A hen of any of the heavy breeds will naturally eat less food proportionally than a hen of any of the light or non-sitting breeds. This is common sense pure and simple, yet this known and unknown quantity should be the poultry-feeder's guide on every occasion. As a rough measurement, 2 ozs. of mash should be given in the morning, and 2 ozs. of grain at night, whilst when meat or green cut bone is given at mid-day, about ½ oz. should be the proportion for each bird.

**STUDY THE SEASONS.** The amount of food a hen requires will also depend on the time of the year, also environment and weather conditions. A hen that is on open range will naturally find a good deal of her food, especially in the summer time. A hen, too, will require more food when she is in lay than when resting, whilst more food will be readily eaten during the winter months than in the summer. If every hen was of the same age and weight and laid the same sized egg, we might be able to fix a standard for feeding. The poultry-keeper, however, who studies his seasons and his menus, and mixes the latter with an object in view, will surely triumph over his friend who has no system of feeding whatsoever.

**WHEN HENS ARE FAT.** Every poultry-keeper should take the trouble to examine his birds from time to time to see what condition they are in. The best time to apply the test is in the evening after the birds have already gone to roost for several hours. If the amount of food in the crop is not deemed satisfactory when compared with the number of hours the birds will be roosting, the evening food should be increased accordingly. A good layer is a good eater, my reader must remember, but she must not be allowed to get fat. It is far better to keep the birds on the hungry side (within reason of course) than fat and lazy.

**A GOOD EVENING FOOD.** During the cold and long winter evenings, the hens *must* go to bed with full crops, otherwise the food consumed if short, would not last the night. This is the reason why hard grain feeding is the method most commonly practised at the evening meal. Many poultry-keepers give the soft food at night, and the grain feed early morning, but this is not a wise practice, for the winter months at any rate. I see no objection to altering the modes of feeding, as a change only for such would be appreciated by the fowls, who seem to show better results where variety of feeding is occasionally carried out. During the summer, the feeding of grain in the morning and the wet mash at night, might well be tried at frequent intervals, whilst I can recommend it from experience in the winter when the weather is congenial, but *not* as a regular thing.

**TO REDUCE SURPLUS FAT.** Once hens have been allowed to get fat and inactive, it will take a long time to get them back to their normal condition. The first step to reduce the internal fat, is to reduce the rations, especially the soft mash, and give the culprits Epsom Salts. By making the hens scratch for their grain feeds, the danger from over-feeding will be lessened. Plenty of scratching exercise means health and activity with laying hens. Where bran is fed dry in a little box or hopper, this will be found to help the other foods digest. If the birds take too much of it, close the hopper for a certain period each day.

**FEEDING WARM MASHES.** Many poultry-keepers make the mistake of giving their hens *too much* warm food early in the morning. Where full egg-baskets are desired, the hens must be kept active all through the day. Where a heavy feed of the mash is fed in the morning, the hens will show a tendency to mope about for a long period afterwards, without commencing work. That is one of the reasons why wet mash feeding may eventually suffer at the expense of dry mash feeding, where the hoppers can be closed directly the birds appear to have had sufficient. The danger of the mopiness after the warm mash can be avoided if the fowls are not allowed too much. I would suggest that directly after a reasonable meal has been served up, the hens be given a scratch feed of grains in the litter. This would help to keep the birds active and enable the mash to digest properly.

## CHAPTER XIII.

# SOME WELL-KNOWN EGG RATIONS.

MASSACHUSETTS COLLEGE RATIONS—NEW JERSEY MENUS—WILL HOOLEY'S MENU FOR INTENSIVE HENS—CALIFORNIA RATIONS.

SEVERAL authorities argue that the *amount of food digested* by the hens should be taken into account when balancing a ration. The tables appearing in this book do not allow for this, as the principles of feeding as recommended, will not be far from the mark. In every branch of life we meet people ever ready to upset well-thought-out systems, and too much importance cannot be attached to their arguments. Such people usually wrangle for the sake of wrangling.

The following rations, used with much success in the feeding of heavy egg-producers, are given so that my readers can scrutinise them for their own guidance and for the sake of experimental feeding work if necessary.

**MASSACHUSETTS AGRICULTURAL COLLEGE RATIONS.** The method of feeding adopted at this College is to feed scratch grain at night and morning, the grain being varied according to the season and condition of the hens. Dry mash is kept in hoppers before the hens at all times. To force the hens, if necessary, a portion of the dry mash is wetted and fed at night in troughs. Fresh water, oyster shell and grit are kept before the hens, whilst mangels and cabbages are fed whole every day when possible, but at least three times a week. The rations consist of :—

| *Dry Mash* 1. | | *Dry Mash* 2. |
|---|---|---|
| 2 parts Wheat Bran | | 1 part Wheat Bran. |
| 1 part Wheat Middlings | | 1 part Wheat Middlings. |
| 1 part Maize Meal | | 1 part Maize Meal. |
| 1 part Alfalfa (Ground) | or | 1 part Finely Ground Oats. |
| ½ part Beef Scrap | | 1 part Alfalfa (Ground). |
| ½ part Oil Meal | | 1 part Beef Scrap. |
| ½ part Gluten Meal | | |

*Grain Ration (Morning and Afternoon).*

2 parts Cracked Maize.
1 part Wheat.
1 part Oats.

*Mr. Will Hooley's Dry Mash Menu for Intensive Hens.*

| *Dry Mash.* | | *Grain.* | |
|---|---|---|---|
| Bran ... ... | 5 parts | Kibbled Wheat ... | 3 parts |
| Granulated Meat or Fish Meal ... | 2 parts | ,, Maize ... | 1 part |
| Peameal ... | 1 part | Canary Seed ... | 1 part |
| Ground Oats ... | 2 parts | Millet ... ... | 1 part |
| Middlings ... | 2 parts | Split Peas ... | 1 part |

*Time Table.* 9 a.m., green food ; 10 a.m., grain ; 2 p.m. to close of day, dry mash in hoppers. Skim milk may be given to drink during the morning, water rest of the day.

*New Jersey Rations.*
*Dry Mash.*

| | |
|---|---|
| Wheat Bran ... ... ... | 2 parts. |
| ,, Middlings ... ... | 2 parts. |
| Ground Oats ... ... ... | 2 parts. |
| Maize Meal ... ... ... | 1 part. |
| Gluten Meal ... ... ... | 1 part. |
| Meat Scrap ... ... ... | 1 part. |
| Alfalfa (cut short) ... ... | 1 part. |

Nutritic ratio, 1 in 3. This mash is kept before the hens all the time in large self-feeding hoppers. It is designed especially for white Leghorns, and where heavy breeds are concerned, the hoppers are left open during the afternoon only. During the moulting season, oil meal is substituted for the gluten in the same proportion, to hasten the growth of the new feathers. Meat scrap is reduced in amount directly the birds are out on green grass, whilst in the spring, the alfalfa meal is gradually omitted.

During the summer, the dry mash is changed according to the amount of range the birds are allowed to have.

Supplemental to the dry mash, a morning scratch feed of whole grain is fed about nine o'clock in deep litter. About 5 lbs. of the ration is fed to each 100 hens on the floor of the house or under some shelter where the litter is dry. The mixture consists of clipped oats and wheat in equal amounts.

In the afternoon, about four or five o'clock, according to season, a night ration is given, consisting of both whole and cracked —10 lbs. to each 100 birds.

During the summer, the evening ration consists of equal parts of cracked corn, wheat, clipped oats and buckwheat for the white Leghorns, with only half the cracked corn and barley in place of buckwheat for the heavier breeds. It is considered that every hen costs 1.40 for feed during the year. Green food must not be overlooked with regard to the above rations.

**CALIFORNIA RATIONS.** The two mashes given below are recommended for use by the California Station. They are calculated for 100 hens a day, and if fed with from 9 to 12 lbs. of grain, according to weight of hens and some succulent green foods, they will prove well-balanced rations. The mash may be fed wet or dry.

| 1. | lbs. | 2. | lbs. |
|---|---|---|---|
| Bran | 3.0 | Bran | 2·0 |
| Linseed Meal | ·5 | Alfalfa Meal | ·5 |
| Middlings | ·5 | Maize Meal | 1·5 |
| Gluten Feed | 1·0 | Shorts | 1·5 |
| Ground Oats | 2·75 | Barley Meal | 1·1 |
| Maize Meal | 2·25 | Ground Beans | 1·1 |
| Beef Scrap | 1·50 | Beef Scrap | ·5 |
| Coarse Bone Meal | 1·0 | Coarse Bone Meal | 1·0 |

Salt is recommended for use in every mash, about an ounce being sufficient. Fresh lean meat may be substituted for beef scrap, three measures of the former being equal to one of the latter.

The rations recommended by the poultry department of the *Cornell University* are given in Chapter XI.

In the matter of condiments these must be used very judiciously, as any undue forcing will lead to disaster. An occasional condiment or tonic will prove beneficial to the hens, but an excess of such foods is inadvisable.

## CHAPTER XIV.

# FEEDING LESSONS FROM LAYING COMPETITIONS.

---

INTERNATIONAL CONTEST AT STORRS—WORLD'S RECORD LAYING—THE HARPER ADAMS' COLLEGE 12 MONTHS' COMPETITION—SOME 200 EGG PULLETS.

MUCH can be learned from the Laying Competitions they provide poultry-keepers with much interesting literature as regards housing and feeding. Our Colonial friends concerning their Laying Contests and I am very glad to see the Utility Poultry Club following suit. In connection with their 12 months' Laying Competition at the Harper Adams' College, 1912-13, issued a most interesting report, setting out very instructive data on the feeding and management of the hens that competed. This is surely a step in the right direction, and the Club is deserving of much praise. The only way to advance the poultry industry of this country is, in my opinion, by way of instructive literature.

**CONTESTS AT STORRS.** The International Laying Contests held annually at Storrs, Connecticut, has suddenly come into the limelight in this country. This is due to the fact that in the second contest—1912-13—an English pen of White Leghorns secured top prize with a score of 1,190 eggs, whilst the 2nd, 4th and 7th places were also secured by English hens. I propose giving the feeding rations used in connection with the Storrs Competitions, on account of the good laying results of the hens that competed. One hundred pens competed, each pen containing five birds—a total of 500 layers. The report from the superintendent of the competition reads :—" The best individual score for the contest was 282 eggs. This was made by a Single Comb White Leghorn, owned by Mr. Tom Barron, of Catforth, England. The best record made in any contest in the United States heretofore was 281 eggs. The second individual, another Single Comb White Leghorn, belonging to Mr. Burton E. Moore, Winsted, Conn., produced 267 eggs. The three next individuals, with scores of 262, 256 and 253 eggs respectively, were all made by English birds. The average individual production for the five pens entered by Englishmen, was 204 eggs. This average would have been much higher if it had not been for one or two individuals that did poorly. The average for Mr. Barron's pen was 238 eggs. The average for all the birds in the contest was 156 eggs. The best production for any month was 141 eggs, made by a pen of Single Comb White Leghorns. The best record for any week was 32 eggs, which was credited to three individual pens.

Below are the formulas of the feeds used in the contests at Storrs :—

| *Dry Mash.* | lbs. | *Scratch Feed.* | lbs. |
|---|---|---|---|
| Coarse Bran ... ... | 200 | Cracked Corn ... ... | 60 |
| Corn Meal ... ... | 100 | Wheat ... ... ... | 60 |
| Gluten Feed ... ... | 100 | Heavy White Oats ... | 40 |
| Ground Oats ... ... | 100 | Barley ... ... ... | 20 |
| Standard Middlings ... | 75 | Kaffir Corn ... ... | 10 |
| Low Grade Flour ... | 25 | Buckwheat ... ... | 10 |
| Fish Scrap ... ... | 30 | Coarse Beef Scrap ... | 10 |
| Beef Scrap ... ... | 30 | | |

" For green food, dried beet pulp is used in the following manner : Four pounds of pulp are soaked in water for about two hours, then each pen of five birds is fed four one hundredths of a pound each day at noon. In feeding beet pulp for green feed, we get just the conditions needed for egg-production during winter. One pound of dried beet pulp will absorb four and a half pounds of water. Now an egg is largely composed of water, and to produce an abundance of eggs, the hens must drink a great deal of water, but that is just what a hen won't do in cold weather. In consequence of that condition, people get few eggs at this season of the year, but by feeding plenty of beet pulp, which has previously been soaked in water, the hen gets that water which is so much needed for egg-production. Dry mash is before the birds at all times, and the whole grain is fed in a Norwich hopper."

**HARPER ADAM'S CONTEST.** I give below the system of feeding adopted in connection with 12 months' Laying Competition, carried out at the Harper Adams' Agricultural College, Newport, Salop, 1912-13, in conjunction with the Utility Poultry Club. Six hundred pullets competed and laid a total of 91,115 eggs. The following table of results may interest many of my readers :—

| | |
|---|---|
| Total eggs laid in 12 months by 600 pullets ... ... | 91,115 |
| Average No. of eggs laid in 12 months by 6 pullets (1 pen) | 911.15 |
| Greatest No. of eggs laid in 12 months by 6 pullets (1 pen) | 1,389 |
| Average No. of eggs laid in 12 months by each pullet in best pen ... ... ... ... ... | 231.5 |
| Average No. of eggs laid in 12 months by best ten pens | 1,179 |
| Smallest No. of eggs laid in 12 months by 6 pullets (1 pen) | 526 |
| Average No. of eggs laid in 12 months by each pullet in worst pen ... ... ... ... ... | 87.7 |

One hundred pens competed in this U.P.C. 12 months' Contest, each pen containing six pullets.

The method of feeding adopted at the commencement of the test, was to feed two meals per day. A soft warm mash was fed early in the morning, and grain food in the afternoon inside the house in litter. Under this treatment the birds did not take sufficient exercise, the tendency being to stand about after the morning feed of warm mash. This method was changed to three feeds per day. The morning feed consisted of warm mash as before, only in less quantity, followed almost immediately by grain food given in the litter.* The third feed was given in the afternoon as before. The change (says the report) was so obviously beneficial, the birds appearing so much healthier, brighter and more active, that the feeding was entirely reversed, one feed of grain being given in the morning and one of warm mash in the afternoon. This gave better results than either of the former methods, and was therefore adhered to throughout the rest of the test. It was considered essential to keep the birds busy scratching as much as possible, and by this method of feeding, the maximum amount of scratching was obtained.

The *Grain Food* used consisted of a mixture made up of the following grains, in the proportion stated :—

| | |
|---|---|
| Dari ... ... | 5 parts by measure. |
| Buckwheat ... | 5 parts by measure. |
| Hemp ... ... | 1 part by measure. |
| Millet ... ... | 1 part by measure. |
| Kibbled Peas ... | 2½ parts by measure. |
| Kibbled Beans ... | 2½ parts by measure. |
| Kibbled Maize ... | 5 parts by measure. |

---

*Litter used consisted of oat straw, wheat straw, cavings or peat moss.

This mixture was fed in conjunction with other grains as follows :—

|  |  |  |
|---|---|---|
| (i) | Kibbled Wheat ... | 1 part by measure. |
|  | Mixture ... | 1 part by measure. |
|  | or |  |
| (ii) | Kibbled Wheat ... | 1 part by measure. |
|  | Mixture ... ... | 2 parts by measure |
|  | Whole oats ... | 1 part by measure. |

The oats used were short and plump and of the Scotch potato oat type. Rather more maize was used in cold and wet weather, and in summer the maize was reduced to about half the quantity fed in the winter. All large grains were kibbled as small as possible without making a lot of meal, the meal being sifted out before using and utilised in the warm mashes.

The *Warm Mash* consisted of the following :—

|  |  |
|---|---|
| Biscuit Meal ... ... | 6 parts by measure. |
| Bran ... ... | 6 parts by measure. |
| Fish or Meat Meal ... | 3 parts by measure. |
| Sharps ... ... | 8 parts by measure. |
| Sussex Ground Oats ... | 2 parts by measure. |

The biscuit meal, bran and fish meal were all thoroughly scalded with boiling water and allowed to soak for about twenty minutes. They were then put in the mixing trough, together with the vegetables, and the various meals added and mixed thoroughly by hand until the mixture was in a fairly dry crumbly state. In this condition it was fed on the ground in the runs.

Vegetables were given in the form of steamed swedes, carrots or raw chopped onions mixed with the warm mash during the winter months. These three vegetables were taken in rotation. In summer, lawn clippings, lettuce, chaffed lucerne and cabbages were used in the mash. During the winter months, fresh green bone was given once a week, the allowance being about half-an-ounce a bird. Bone-meal was used once a week when green bone was not available. A plentiful supply of grit and oyster shell was always kept before the birds in small troughs. As much food was given as the birds would eat readily. The quantity depended upon the breeds, also whether the birds were in full lay, resting, moulting or broody.

*Analysis of foods used.* Fish Meal—Albuminoids, 55 per cent. ; Phosphate of Lime, 17 per cent. ; Oil, 3 per cent. ; Sussex Ground Oats—Albuminoids, 10.5 per cent. ; Oil, 6.83 per cent.

Biscuit Meal—Albuminoids, 15 per cent.; Oil, 2.5 per cent. Meal Meal—Albuminoids, 45.12 per cent.; Fats, 17.59 per cent. The total cost of the foods consumed during the twelve months, including grit, medicines, etc., was £237 16s. 5d. The average cost per bird per year for feeding was 7s. 11d. or 1.8d. per week. Each bird then had to lay 883.4 eggs at an average value of 4d. each to pay for food consumed.

## HARPER ADAMS 1918—1919 COMPETITIONS.

### SINGLE BIRDS.

The highest individual records of standard eggs (this is the total weight of eggs in oz. divided by two) at the Harper Adams College Laying Competition of 1918—1919, were: Leghorns, Mr. C. P. Mason 276; Wyandottes, Mr. J. Thomas, 270; Rhode Island Reds, Mr. J. Bolling, 263; Anconas, Mr. W. Darracott, 259; Sussex, Mr. W. Lister, 250; Plymouth Rocks, Mr. A. Wright, 249. At the same competition small flocks pen winners were: Wyandottes, Mr. A. White, 1444 eggs; Leghorns, Mr. C. P. Mason 1377 eggs; Plymouth Rocks, University College, Reading, 1264 eggs; Rhode Island Reds, South Hants Poultry Farm, 1254 eggs; Buff Orpingtons, Mr. R. Margerison, 1243 eggs; Anconas, Mr. G. B. Metcalf, 1186 eggs. Large flocks: Leghorns, Mrs. J. Craddock, 1032 eggs; Wyandottes, Mr. A. Walford, 983 eggs; Rhode Island Reds, Mrs. Hindson Hall, 794 eggs.

## NATIONAL TEST AT BENTLEY, 1918—1919.

White Leghorns, Mr. J. Hope, 986 eggs, score value 978; White Wyandottes, Mr. J. Parsons, 959 eggs, score value 959; Sitting Breeds, Mr. W. Measures (Rhode Island Reds), 879 eggs score value 879; Non-Sitting Breeds, Mr. P. Culshaw (Anconas), 854 eggs, score value 854.

## BRITISH HENS LEAD THE WORLD.

The results of the North American Competition show that the White Wyandottes entered by Mr. Tom Barron, carried off 1st prize with 1171 eggs. The 5th position in the test and 1st and 2nd positions for individual records were won by Messrs. Saul and Greenhow, with White Wyandottes, which produced 1017 eggs. The individual records were 272 and 266 eggs. The test was from October 30th, 1918, to November 30th, 1919. Five hundred birds competed in pens of five birds each. The figures give Mr. Barron's pen an average of over 234 eggs. Heartiest congratulations to Messrs. Barron and Saul, and their birds show that British stock is still the best the world can produce.

**CONCLUSIONS.** Many conclusions may be arrived at after comparing the feeding menus used in the different laying competitions. The good results of the hens in the Storrs Contest must carry weight in recommending the *dry mash* system. In this contest the world's record laying for a single bird in twelve months was set up, *viz.*, 282 eggs by one of Mr. Tom Barron's (Catforth, Nr. Preston) White Leghorns. The fact that the English layers did so well in the contest, suggests that the system of feeding should be suitable for heavy egg-producers in this country. Doubtless ere long we shall be treated to " feed " tests, run in conjunction with our laying competitions, and I am sure such would be appreciated by all who are out for the new-laid egg. As things stand at present, I sincerely think that every poultry-feeder should experiment with different rations until he discovers that which produces the best results.

## CHAPTER XV.

# FEEDING APPLIANCES, ETC.

THE FEED HOUSE—LOCATION OF FEED HOUSE—COPPERS—FOOD CARRIERS—TROUGH AND HOPPERS—HEN HOSPITAL—THE HAY BOX—OTHER APPLIANCES, ETC.

THE average novice when selecting a farm does not trouble his head about the outbuildings connected with same. His mind is on the hens that will soon be running about the grass land or on those already stocked thereon. It is not till he has taken up his abode at the farm that he finds he is short of outhouses and does not know where to store his food, etc. Unless a farm boasts of numerous outhouses, it is of little use for the poultry farmer, for the more outhouses there are the better.

**A FEED HOUSE.** In the first place, there must be a feed house. If one of the outhouses cannot be turned into a feed house, a special structure must be put up. It is impossible to say how big the feed house should be, as this will depend upon the extent of the farm. Where the poultry-farmer is in a small way, an outhouse can be used, the feeding appliances and foods being kept in the same building. Where, however, the owner has a very extensive business, he will require plenty of room for the storing of his foods, whilst his feeding appliances will also have to be accommodated. The wise utility poultry-farmer will naturally study the poultry food markets and buy a good quantity of this or that food when the prices are moderate and the samples above the average. If he has a rather long house, he can section half of it off for the foods to be stored in, and use the other half for the appliances, etc. Many poultry-farmers build their feed houses with two storeys, the top being used for the food, and the bottom for the appliances, etc., used in the mixing of same. The food, when required, passes from the top floor by means of chutes.

**LOCATION OF FEED HOUSE.** The feed house must necessarily be well situated. Its best location would be near the fowls, but this is not always possible unless a special house has to be erected. Where an outhouse is brought into use, the building that is best situated should be the one selected. The feed house must be managed in a systematic way, and there should be a certain place for every appliance. The labour attached to the feeding of the fowls will in this way be reduced to a minimum. Where rats or mice give trouble, arrangements must be made to prevent them from getting into the house.

**FOOD CARRIERS.** If the feed house is situated a considerable way from the fowls, special food carriers will have to be used. Any design can be selected, whilst on the return journey, they may be used to take the eggs back to the farm. Wheelbarrows are always handy, and a good stock should be kept on every farm.

**CORN BINS.** Corn bins are essential and can be used for both grain and meal. In the store room, the foods can be kept in very large bins, whilst smaller ones can be brought into play in the food mixing section of the food house. All will depend on the style of the feed house, however, as regards how the foods etc., are to be kept. Corn bins are usually expensive, so that wooden tubs lined with tin can be used where procurable. Where wooden bins are used, tar the outside halfway up to keep rats or mice away.

**COPPERS.** Where the warm morning mash is given, a copper or two must be fitted up in the house, and their size and number will again depend upon the extent of the poultry business. The feeding troughs, etc., should be regularly scalded out, and warm water from the copper will be found handy for this purpose.

**OTHER APPLIANCES.** A *bone cutter* will always come in handy. Bones fresh from the butcher's should be passed through the cutters, and this cut bone will be found an excellent and cheap animal food for the layers. A *mincing machine* will be found useful for mincing up meat scraps, greenstuff, etc., finely for the chicks. A *hay cutter* will enable the poultry-farmer to cut up his fresh clover, alfalfa or greenstuffs. A *hurricane lamp* will be necessary for night work or in case of emergency. A stable lamp is a good one for the purpose. A *special bin* will be needed in which to mix the mashes and grains if this is done in a large way. The various feeding appliances used on the farm will best be decided by the extent of the farm and the tastes of the owner. In the case of drinking vessels, earthenware vessels are best, as when giving medicine in metal vessels it will sometimes corrode same.

**TROUGHS AND HOPPERS.** Wooden troughs are best for use in the feeding of the warm mash, and the ordinary V-shaped ones are the most popular. Their size will depend upon the number of birds that will use them. They must be regularly scoured out and made to hang on the wall when not in use. Several Intensivists use lengths of ordinary rain water spouting, but whatever are used, they must always be kept clean.

As regards hoppers, these are made in many different styles and can be purchased cheaply from several of the appliance firms. As previously mentioned, the principle of the hopper appliance is very similar to that of the self-filling drinking fountain. The food is placed in the top of the receptacle and passes through into kind of cups, filling the latter to a certain height to avoid any waste of food. As the birds eat the food in the cups, more material falls from the body of the hopper, so that owing to this self-filling principle, the birds always have supplies at hand. It is a good plan to have a lid to cover the feeding cups, so that the hopper can be closed during parts of the day, should this be found necessary. The feeding of the dry mash in hoppers has been previously described and as regards the size of the hopper, this will depend upon the number of birds to be fed. Smaller hoppers after the same design will come in handy for receptacles for grit and charcoal.

**AUTOMATIC FEEDERS.** Of late, self-feeding appliances for grain have become popular, the "Norwich" automatic feeder deserving special mention. The hopper or body of the appliance is filled with grain, and when the birds peck at the corn placed as the bait, an automatic arrangement causes a certain amount of grain to be released from the hopper and scattered on the ground beneath. These appliances are fitted with legs and are being extensively used, both in Intensive houses and breeding pens. Smaller sizes are made for young chickens, and these should prove even more useful than the large ones for hens.

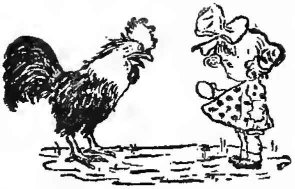
**A HEN HOSPITAL.** No poultry farm equipment can be complete without a special hen hospital. An ordinary well-lighted outhouse can be brought into use, failing a specially constructed house. The interior fittings can be after the style of the fancier's exhibition house. Ordinary wire show pens should be fitted around the walls, say, two tiers in height, and directly any birds are found to be ailing, they should be removed to the hospital for treatment. On a big establishment, this will mean the prevention of any serious breaking out amongst the stock. The pens should be disinfected and kept continually cleaned out. A medicine cupboard must be fitted up in the hospital, and the well-known remedies for poultry ails stocked. A book on diseases should be handy, and any paragraphs or articles appearing in "The Poultry World," treating on ailments, should be cut out and pasted in a book, the latter being properly indexed. The hospital should be nice and cosy inside and located on the farm to the best advantage.

**THE HAY BOX.** The choice of feeding appliances is just as important to the small poultry-keeper as the large one. A stock pot should be kept, into which scraps from the table should be placed. In the matter of feeding troughs, V-shaped wooden receptacles can be used and made to hang up in the run when not in use. The small poultry-keeper who is handy with his tools, can make some very handy feeding appliances during the long winter evenings. Many backyard poultry-keepers have an arrangement whereby the fowls can be fed on a wooden platform outside the run. It is claimed that by this method there is no need to enter the run to feed the fowls and so disturb them. An oblong piece is cut from the wire netting of the run, and a platform fitted outside the run. Wooden spars a certain distance away from one another are fitted to the wire, through which the birds can feed from the platform. The same arrangement is followed for the drinking water. What is called the " Hay Box " is very much used by small poultry-keepers. An ordinary Tate's sugar box is taken, and several thicknesses of newspapers pressed tightly down all round to keep any draughts out. Plenty of hay is next added, this being squeezed down very tightly. Two rather deep cushions are now packed with hay. The stock pot or saucepan is put on the fire at night for the contents to boil, and then it is placed in the " Hay Box " and covered with the two thick cushions. Saucepans with the handle over the top are the best to use. In the morning, the food will still be very warm and ready for feeding. This is a labour-saving device, and the fowls need not be kept waiting long for their warm morning feed.

**APPLIANCE CATALOGUES.** Many poultry-keepers seem to think that appliance catalogues are only necessary when some appliance or other is wanted. Instead of waiting until something is required, let my reader drop a postcard to each appliance firm for its current catalogue. Much can be learned from a perusal of these illustrated guides, whilst quite a number contain hints on poultry-keeping. After hearing a man at a show (or lecture for instance) refer continually to, say, a bran hopper, fireless brooder or cold brooder, it is nice to be able to look up such appliances in trade catalogues upon arrival home. This is a much wiser plan than going on without troubling to follow his arguments.

The question of feeding hens for the best results is a very wide one, but I have endeavoured to cover as much detail as possible in the space available. Scientific feeding in conjunction with common-sense methods will go a long way to make heavy egg-production a great success.

*Made at Neptune Mills, Oban, N.B.*



*"I think oor wife dropped zis!"*
*"She's doing that every day since she got ALESCO."*

**ALESCO**

guarantees fine robust healthy birds, an abundance of eggs—bigger eggs, more fertile eggs than any merely Poultry Spice can produce.

**ALESCO**

is *much* more than POULTRY SPICE

**ALESCO**

**IS**

a most valuable all-the-year-round

**MEDICINAL FOOD.**

**9d.** Per Pkt. If unable to obtain from your usual Corn Merchant, send to—Dept. A.B. 10, Colonnade Passage, New Street, Birmingham. **7lbs. 4/-**

---

***Every Progressive Smallholder and Allotment Holder should read***

**THE**

**SMALL HOLDING and ALLOTMENT**

*Incorporating "Food"*

**THREEPENCE WEEKLY**

THE Ideal Paper for everyone interested in Farm, Garden, Allotment, Live-Stock, Poultry, and Kitchen. Covers the entire field of food production.

Special articles on all the above subjects by real experts every week. Send for a free specimen copy. You will like it, and the wife will like it too,

On sale at all newsagents and principal bookstalls throughout the country.

**The Publisher, 154 Fleet Street, London, E.C.4**

# PRACTICAL BOOKS FOR POULTRY AND LIVE STOCK KEEPERS.

**PRACTICAL POULTRY CULTURE.** By WILL HOOLEY. The most complete and instructive treatise on Modern Poultry Culture ever published. The author gives in his usual thorough manner the fundamental principles which poultry-keepers, adapting them to their own particular conditions, must follow to ensure success. A few of the subjects dealt with: Laying the Foundation, On Housing and Appliances, Foods and Feeding, Exhibition Birds, Mating a Breeding Pen, Geese, Fattening Table Poultry, The Marketing of Produce, Cross-Breeding, The Moult, Ducks and Duck-Farming, Turkeys. Cloth gilt **2/6,** by post **2/8.**

**THE A.B.C. OF POULTRY BREEDING.** Treats the art of breeding in a most comprehensive manner; deals with Exhibition Stock, Management of Laying Stock, Structive of the Egg, Egg Records, and Breeding Table Poultry. Price **1/3,** post free **1/4½.**

**POULTRY APPLIANCES AND HOW TO MAKE THEM.** By L. B. COLLIER. A practical guide to the making of all appliances used in poultry-keeping, from a nest-box to a poultry-house. Illustrated. Price **9d.,** post free **10½d.**

**HOW TO FATTEN FOWLS AND PREPARE THEM FOR MARKET.** With a Chapter on Drawing and Trussing. Covers the treatment of Chickens, Ducks, Geese, and Turkeys. Illustrated. By J. W. HURST, **1/3,** post free **1/4½.**

**EGG INCUBATION.** By J. M. BLACKWOOD. An invaluable work dealing with Incubation in all its phases. The Egg and its Structure; the Embryo and its Development; Natural Incubation; the Advantages of Artificial Incubation; Choosing an Incubator and Operating. An inquire-within, for both amateur and professional. Price **9d.,** post free **10½d.**

**REARING CHICKENS, DUCKLINGS, TURKEYS, AND GOSLINGS.** By WILL HOOLEY. A practical treatise on the rearing of all kinds of stock, giving valuable hints on feeding and fattening for market. Of great value to all breeders desirous of raising strong, healthy stock. Price **4d.,** post free 4½d.

**PIGS, THEIR SELECTION, BREEDING, AND FATTENING.** There is money in pigs if you know how to get it. This book gives simple and valuable information on the subject of pig-rearing, which if followed out, is certain to increase the revenue derived from this branch of food production. Contains chapters on housing, feeding, breeding, etc., and also a special one on diseases and their treatment. Price **1/3,** post free **1/4½.**

**PROFITABLE PET RABBITS.** An extremely practical and useful booklet that treats on housing, hutches, feeding, breeding, mating, rearing, exhibiting, management, diseases, varieties, etc. Price **4d.,** post free 4½d.

**The Publisher, "POULTRY WORLD"**
**154 Fleet Street, London, E.C.4.**

# PRACTICAL BOOKS FOR POULTRY AND LIVE STOCK KEEPERS.

**MONEY FROM DUCKS.** By J. A. WATSON. A new up-to-date manual on the important and highly profitable subject of Duck Culture. It deals with the housing, feeding, breeding, rearing, etc., of utility ducks on present-day lines. Price **9d.,** post free **10½d.**

**POULTRY WORLD ACCOUNT BOOK.** Designed by WILL HOOLEY. The simplest, cheapest, and most practical account book for utility and fancy poultry breeders. This account book is designed on absolutely new and original lines. Covers 12 months from any date. Stiff cloth cover, price **1/6,** post free **1/8.**

**THE POULTRY DOCTOR.** A practical treatise on the Diseases of Poultry, with directions for their treatment, Surgically and Medicinally. The finest book of reference on the subject. Price **1/6,** post free **1/8.**

**THE NUTSHELL SERIES.** Everything you want to know about a given subject in a nutshell. **No. 1—Ailing Poultry, and how to cure them. No. 2—Day-old Chick Business. No. 3—The Orpington. No. 4—The Wyandotte. No. 5—Eggs all the year round. No. 6—Poultry for Beginners. No. 7—Capons and Caponising.** Price **4d** , by post, **4½d.** each.

**EVERYWOMAN'S BOOK OF POULTRY.** By the Hon. Mrs. LIONEL GUEST. There are now thousands of women working on the land who are making reasonable additions to their incomes. This book gives the personal experiences of the above lady during the time she was keeping Poultry. Let every woman take up Poultry-Keeping and help to Produce Eggs and Poultry for the nation's consumption. Price **9d.,** post free **10½d.**

**AMATEUR POULTRY-KEEPING.** Treats of the best and most up-to-date methods of making poultry pay in a small space—the backyard poultry-keeper's practical guide, containing valuable hints on feeding. Price **4d.,** post free **4½d.**

**THE INTENSIVE SYSTEM OF POULTRY KEEPING.** Describes in detail Fireless Brooders, Brooder Houses, small Backyard Intensive Houses, Mammoth Laying Houses, Chicken-Rearing Flats, Canadian Open-fronted Laying Houses, etc. Price **9d.,** post free **10½d.**

**AN INCOME FROM BACKYARD FOWLS.** Shows how it is possible to make a considerable addition to income by keeping fowls in a backyard. Deals with the Utility and Fancy sides of the industry, and is a most comprehensive work, consisting of some 35,000 words. Price **9d.,** post free **10½d.**

**The Publisher, "POULTRY WORLD"**
**154 Fleet Street, London, E.C.4.**

# PRACTICAL BOOKS FOR POULTRY AND LIVE STOCK KEEPERS.

**HOW TO FEED HENS FOR EGG PRODUCTION.** Deals with all the leading questions of the hour.—The Finished Product ; Grains and their Value ; Animal and Green Foods ; Summer and Winter Feeding ; Wet and Dry Mashes ; Feeding on the Intensive System ; Lessons from the Laying Competitions. Price **1/6,** post free **1/8.**

**TURKEYS AND GUINEA FOWL FOR PROFIT.** By AN EXPERT. A practical work on these two profitable varieties of poultry. Deals most thoroughly with the Housing, Breeding, Rearing, Fattening, and Marketing of Turkeys and Guinea Fowl. Price **9d.,** post free **10½d.**

**DUCKS AND GEESE FOR PROFIT.** The value of Ducks and Geese as profit-makers is well known. This book tells in a most practical way how to keep Ducks and Geese profitably. Price **9d.,** post free **10½d.**

**THE SMALL GARDEN AND HOW BEST TO UTILIZE IT.** Contains simple instructions for the novice and many helpful wrinkles for the experienced gardener. Simplicity of diction and clearness of explanation have been aimed at, and any one with a small back garden would benefit greatly by investing in a copy. Price **9d.,** post free **10½d.**

**THE ALLOTMENT MONTH BY MONTH.** What to grow, and how to grow it. By J. W. HURST. An up-to-date Manual in which are brought together all the facts and figures that are essential to the allotment holder. Deals with the cultivation of vegetables of all kinds ; the method of propagation and cultivation, the quantity of seed required, and the best varieties ; and how to protect the crop from pests. Cloth bound **2/6,** post free **2/9.**

**CARE OF THE DOG.** A thoroughly up-to-date manual on " The Friend of Man." Treats on Feeding, Housing, Exercising, Diseases, Varieties, Medicines, Rearing, Washing, Grooming, etc. Everybody who desires to keep their pets in the best of health and condition, should purchase without delay. Price **4d.,** post free **4½**d.

**SUCCESS IN EGG INCUBATION.** By S. H. FRENCH. Describes the real secret of success in egg incubation—a startling thesis, setting out the causes of " dead in shell," crippled chicks, and bad hatches. This book is the result of over three years' experience. Price **1/6,** post free **1/8.**

**100,000 CHICKENS A YEAR ON AN ACRE OF GROUND.** A sensational work by Mrs. O'GRADY, the winner of the " Poultry World's " £1,000 Prize Farm. Get a copy and learn how to realize increased profits. Price **6d.,** post free **7d.**

**The Publisher, " POULTRY WORLD "**
**154 Fleet Street, London, E.C.4**

# If you want first-hand information on all matters affecting the Poultry Industry

## READ THE

# POULTRY WORLD

**Published every Friday.**

## 2D.

**Of all Newsagents and Bookstalls.**

**The "Live Wire" of the Poultry Industry and the WORLD'S PREMIER POULTRY JOURNAL.**

THE POULTRY WORLD is the brightest and most up-to-date poultry journal published.

Besides giving the latest news of interest to poultry keepers, it keeps its readers fully acquainted, week by week, with all modern developments and improvements in housing, feeding, general management, etc.

Its contributors include the greatest experts of the day.

Being a practical paper, it appeals to the novice as well as the expert.

It is the one paper in which you can be sure of finding current events reported in the current issue.

**As an Advertising Medium 'Poultry World' stands alone**

It is the recognized market for buying, selling, or exchanging anything and everything appertaining to poultry and poultry farming.

Judged by *actual* results, it is the *best and cheapest* medium for advertisers, both large and small.

**MAKE YOUR PAPER THE "POULTRY WORLD"**

**You will find it more interesting and practical.**

**Subscription Rates: 10/-** per annum, **5/6** six months, post free. Foreign **14/-** per annum, **7/6** six months, post free.

**THE POULTRY PRESS, LTD.**
**154 Fleet Street, London, E.C.4.**
Telegrams: "Aviculture, Fleet, London.
Telephone: Holborn 5220

*F. Robinson & Co., The Library Press, Lowestoft.*